NOVEMBER 15, 1992
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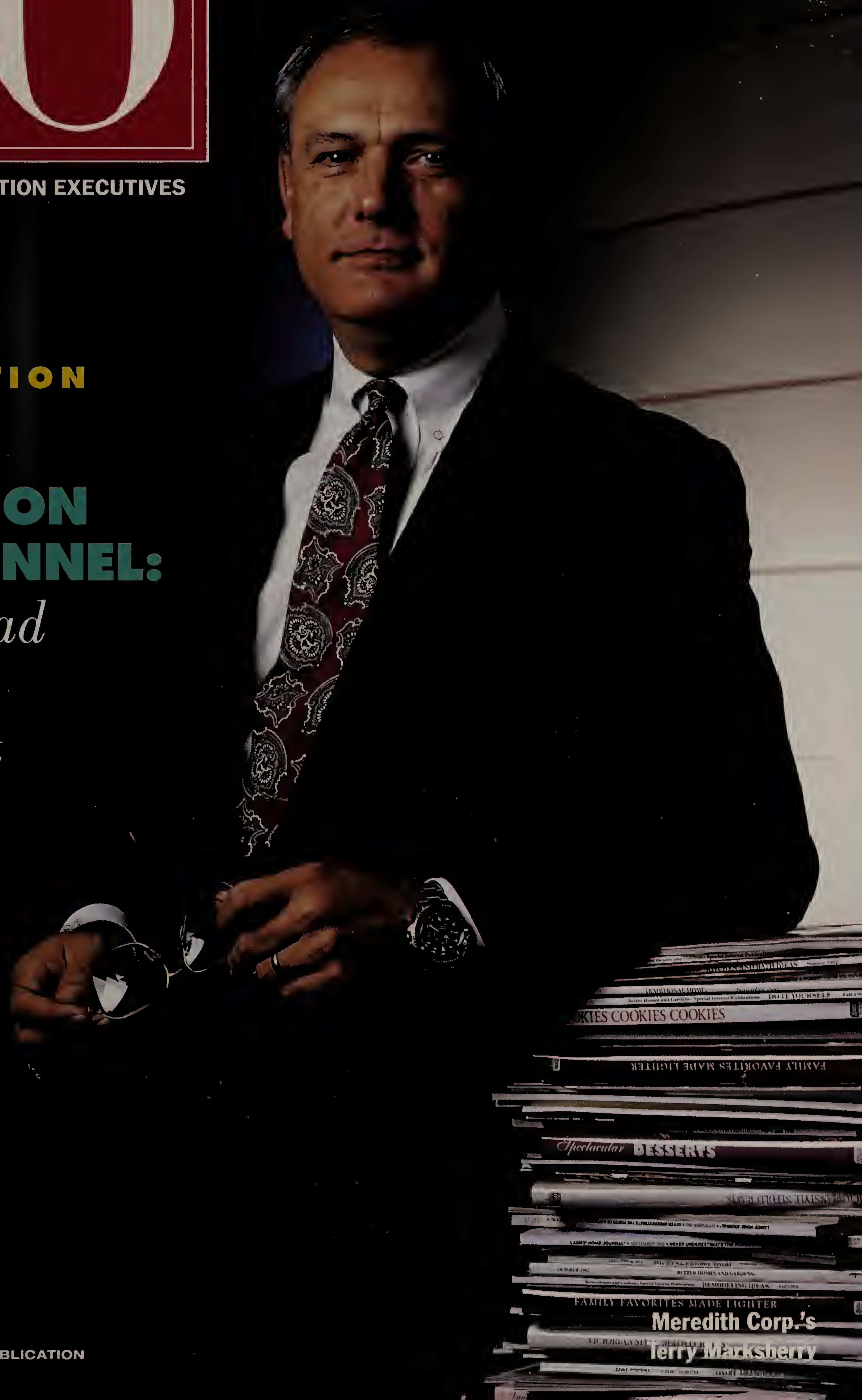
SEVEN DOLLARS

CIO

THE MAGAZINE FOR INFORMATION EXECUTIVES

SPECIAL SECTION

STRATEGIC OUTLOOK ON I.S. PERSONNEL: *Getting A Read On The Talent Deficit*



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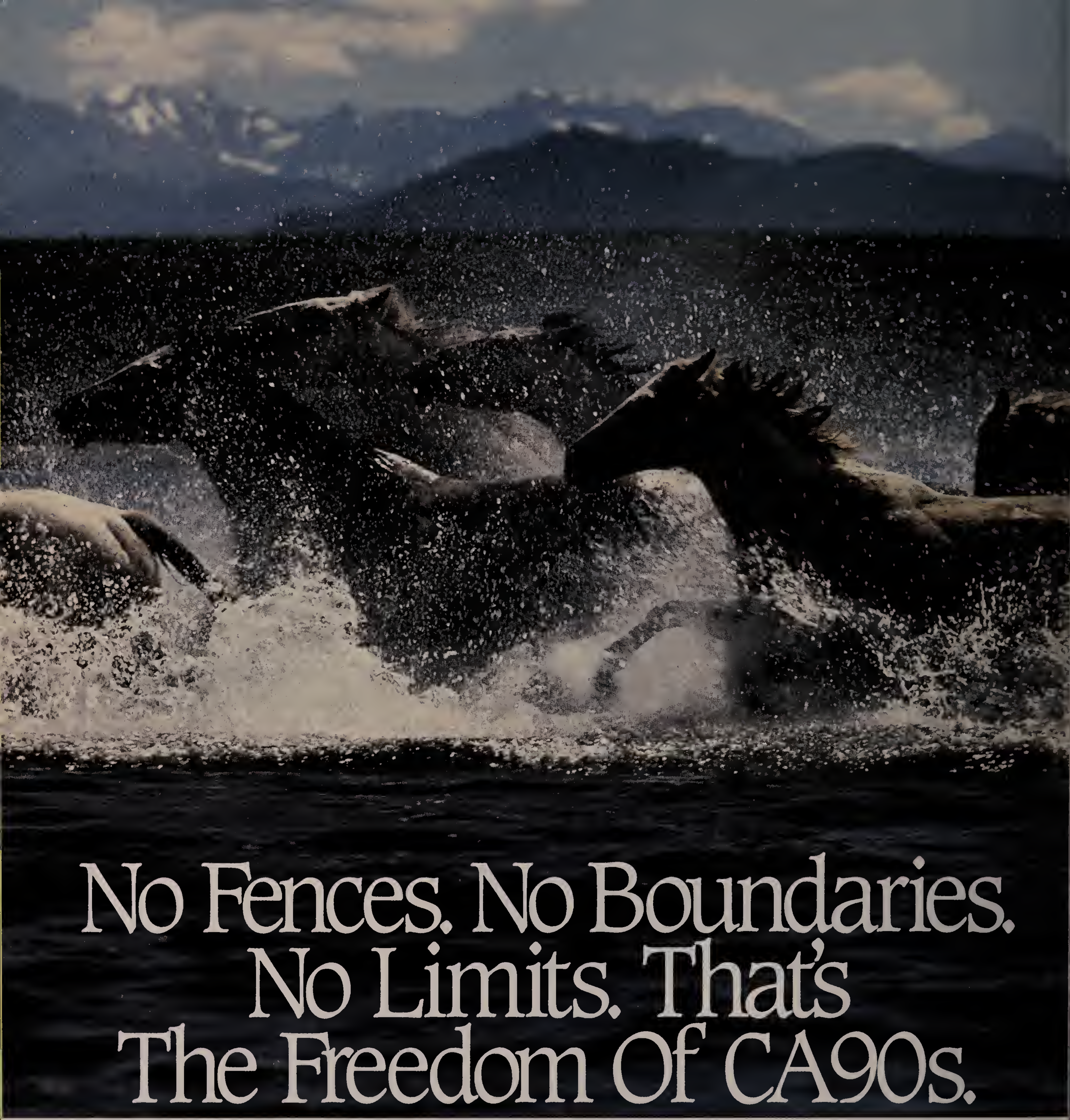

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VOLUME 6, NUMBER 4

CIO, take two **70**
Cover photo by
Neil MacDonald

STRATEGIC OUTLOOK I.S. PERSONNEL

People Who Need People 47

Don't let the job drought fool you: When the weather finally changes, CIOs will be hurting for new talent. But the current upheavals and uncertainties in the field are turning the next generation of IS personnel away.

By Mickey Williamson

Improving Your Holding Patterns 60

Once upon a time, employees signed on with a company hoping they had found a place to hang their hats for good. Today, CIOs trying to retain their best workers must cope with shifting loyalties, new priorities and sagging morale.

By Mickey Williamson

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Managers who misuse the system of rewards may inadvertently discourage the very behavior they want to promote.

By Mickey Williamson

A Survivor's Story 70

The decision to outsource Meredith Corp.'s IS services to EDS could have meant the beginning of the long goodbye for CIO Terry Marksberry. But the media group's top IS executive not only survived—he thrived.

By Mickey Williamson

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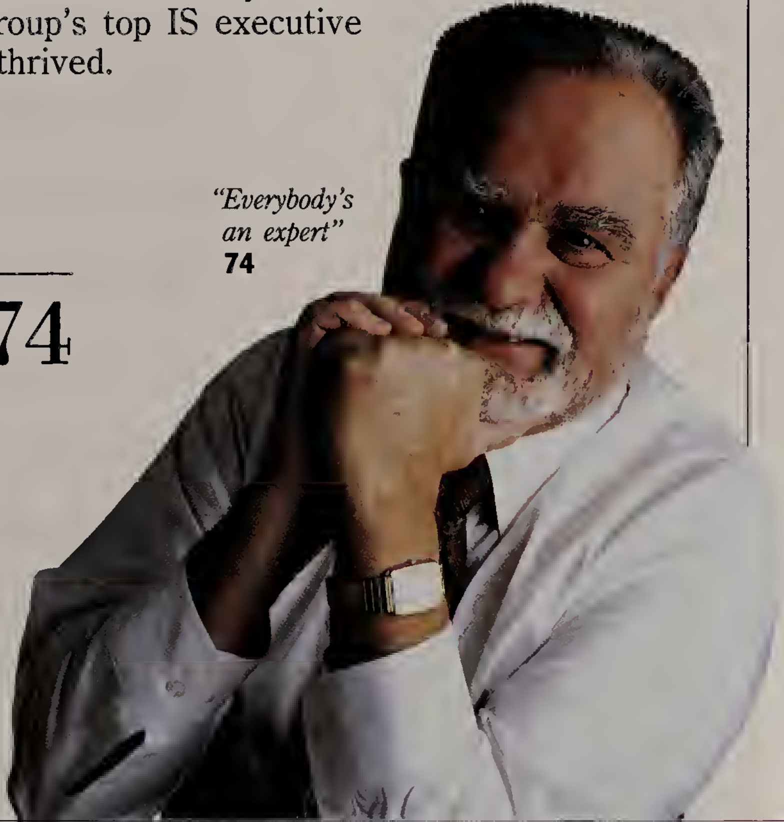
Now that the boundaries between IS and user organizations are inexorably being redrawn, CIOs face a new world order that calls for deftness, teamwork and flexibility.

By David Freedman



"Everybody's an expert" **74**

MORE ▶ ▶ ▶

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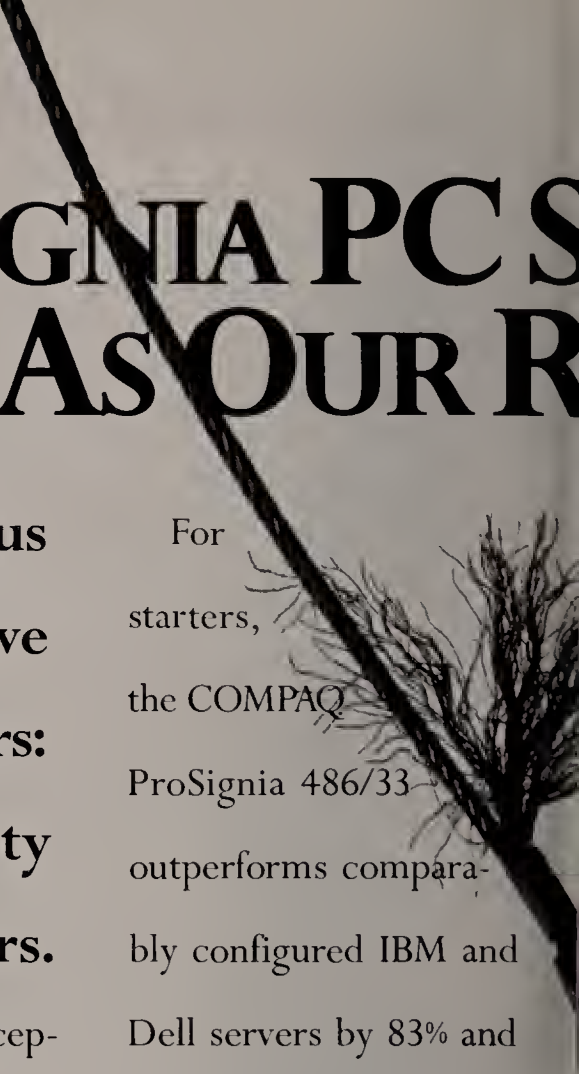

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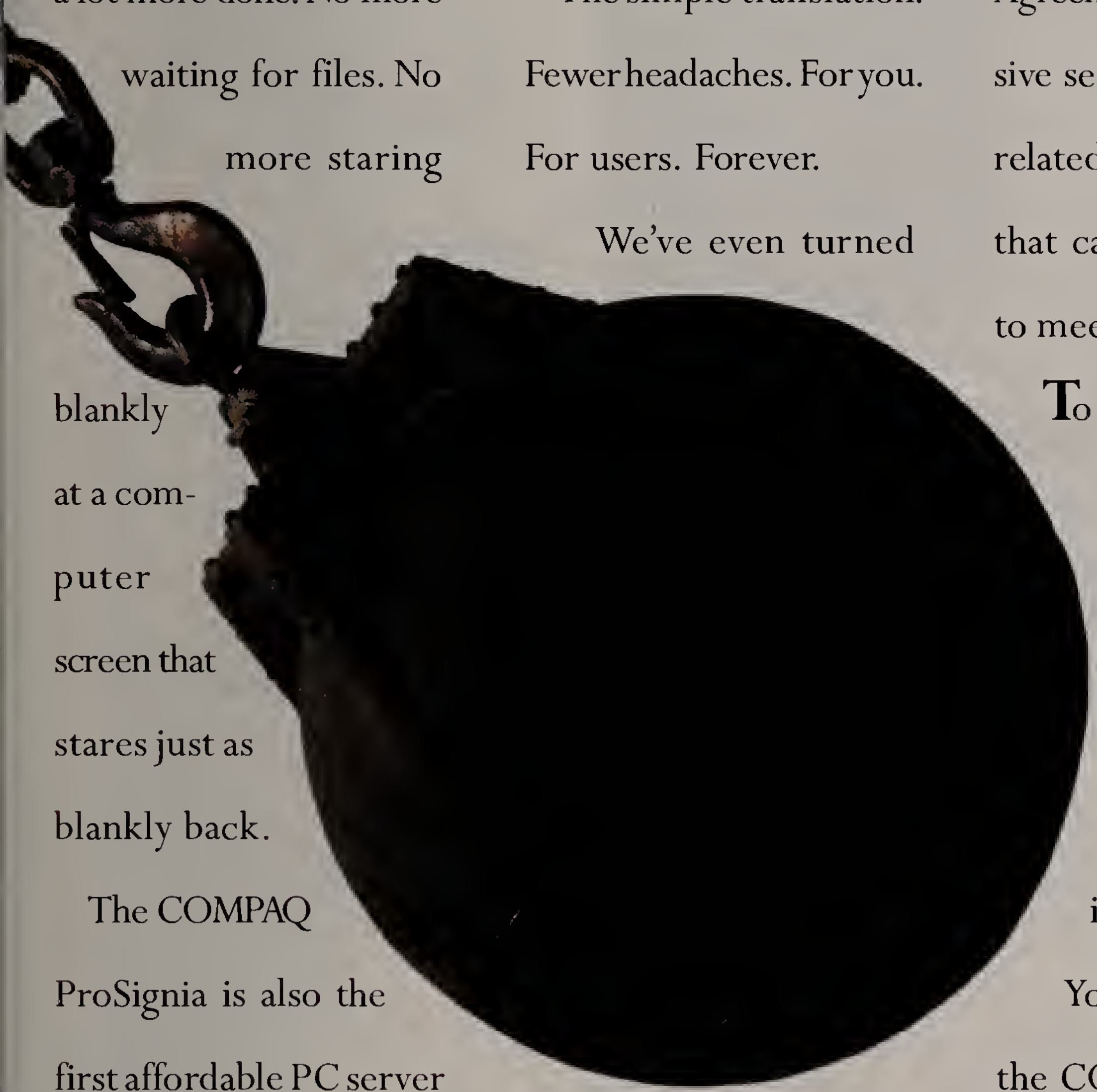

extraordinary capabilities, we offer an optional 32-Bit IDA-2 Controller.

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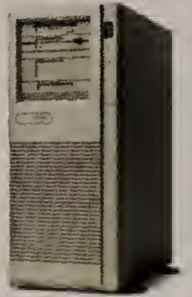

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How a Long Island–based maker of display terminals came home to America and used an innovative shop-floor system to strike a blow for U.S. manufacturing competitiveness.
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CIOs who can mitigate the rigidity of existing software infrastructures while developing long-term plans for more fundamental change will help their organizations garner the fullest possible benefits of business-process redesign.
By Laurence J. Best and Fred L. Forman

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At Hallmark Cards, standard metrics weren't providing an accurate picture of how well IS was servicing its customers. So the department decided to put its performance under a microscope.
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With all sorts of people using all manner of products to communicate over all kinds of networks, it's a wonder anyone ever gets the message.
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Canadian Airlines International Found A Strong CASE For Managing Change.

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In the rapidly changing world of the airline industry, Canadian Airlines International Ltd. understands that keeping seats filled and continually exceeding customer expectations largely depend on how well they manage change. So when they wanted to implement a state-of-the-art frequent flier program in record time, they turned to IEF™ CASE software from Texas Instruments.

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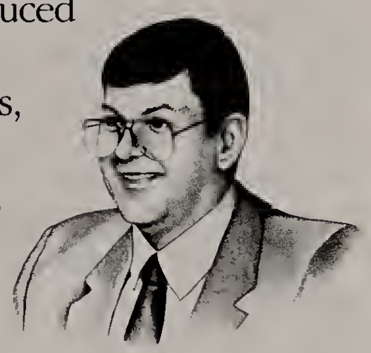
Richard Nelson, Director of Operations, Canadian Technology Services, Canadian Airlines International Ltd., said, "It (the IEF) has brought the airline tremendous benefits in staff and operating cost efficiencies."

In the end, Canadian Airlines International, with the help of the IEF, produced an outstanding frequent flier program. Customers get better service and Canadian Airlines International has increased passenger count.



Richard Nelson
Director of Operations
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LETTER FROM THE EDITOR

PHOTO BY WEBB CHAPPELL

Surveys done by academicians a dozen years ago depicted IS professionals as highly task-oriented and generally insular and noncommunicative, avoiding contact with those outside of the IS cocoon. Despite today's radically changed business environment, IS professionals are still often viewed as hindrances to corporate change. While IT is considered a pivotal component of an organizational reengineering effort, those critical of IS departments see IS as snail-paced when it comes to changing itself. This nit-picking has persisted for some time now, and separating legend from present reality is difficult.

Many of the articles in *CIO* magazine have focused on the business acumen of CIOs and the ways in which they are coaching their IS staffs to learn the business and to concentrate on the business problems of the departments they support. Yet progress on this front may not be advancing fast enough. Our Strategic Outlook (beginning on Page 47) stresses that being flexible, receptive and able to analyze business processes is critical for today's IS professionals. At the same time, corporate downsizing efforts and the need to develop new skill sets have many IS professionals running scared, and morale in many places is at a low point, Contributing Writer Mickey Williamson reports.

Although downsizing looms menacingly on the horizon at many companies, the shortage of IS professionals is expected to get worse. This presents opportunities for IT staff, provided they are willing to embrace the open systems environment and to learn new languages and skills, such as CASE, object-oriented programming and network management.

Like other groups of employees, IS professionals will need to adapt to working in interdisciplinary teams and interacting regularly with departments outside the IS group. Forward-thinking CIOs are expending an enormous amount of energy on creating a new environment that builds morale and lets IS staff take new risks to be successful. The old adage, "Physician, heal thyself," is operative in this case. The challenge requires creative thinking. Are CIOs up to the task? Well, consider the alternative.

Marcia Blumenthal

CIO

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LETTER FROM THE PUBLISHER

PHOTO BY GEORGE SIMIAN

Given that staff downsizing and intense competition for jobs are status quo for most organizations, it's difficult to envision a day when CIOs will be scrambling for skilled IS resources. Yet that day is imminent.

While the demand for programmers and systems analysts is expected to grow by more than 70 percent in the next decade, 23 percent fewer job seekers will be graduated in the year 2000 than in 1990, and no more than 3 percent of the class of 2000 will have majored in computer science. Retaining talented people is becoming more difficult as the "cream of the crop" move from company to company to advance their careers.

How can CIOs prepare for—or prevent—a critical shortage of skilled labor when the economy picks up and demand for IS services increases? How can CIOs get senior management to invest in staff retraining to ensure today's workers can deal with tomorrow's technologies? How can the industry encourage young people to pursue careers in IS?

First, CIOs must acknowledge the imminent IS workforce crisis and communicate its implications in business terms to top management. Sharing this issue's "Strategic Outlook on IS Personnel" may help management focus on the problem before it's too late.

Second, a strategic plan must be developed that envisions IS's future role and the skills necessary to support the organization's business goals by the year 2000. The plan must outline strategies to retain and retrain current employees and attract new ones.

Many colleges and universities desperately need to update their curriculums to attract and prepare students for IS careers. Speaking to computer-science and business classes, assisting the recruiting efforts of your organization, serving on the board of directors of your local university, and providing real-world input into course curricula are a few ways in which CIOs and executives from technology companies can make a difference.

Representatives from business, academia and government must work together to prevent an IS workforce shortage in the next decade. We urge our constituents to do what you can to help.

P.S. Please join us for the next CIO Perspectives conference, "IT Assets: Balancing People, Property, Performance," March 7–10 at La Paloma in Tucson, Ariz. Personnel management issues will be a key topic. For more information, call 800 366-0246.

Coming In CIO

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Foreign Exchange

Becoming an international competitor means more than hooking up a global network. Newcomers to foreign shores find they may have to shelve their time-tested North American IT strategies or let some of their snazzier technical capabilities lie fallow for reasons that have nothing to do with technology.

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(More) Object Lessons

Proponents of object technology expect major reductions in systems-development life cycles and the cost and complexity of maintenance, and greater IS responsiveness to business needs. However, IS departments are cautious about wholesale adoption of a relatively untested concept. And like every emerging innovation, object technology is rife with unresolved issues concerning standards, its incorporation into legacy systems, its limitations as a business tool and its potential effect on the corporate IS culture.

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The Issue of Ethics

IS ethics are defined by concern for data usage, integrity and security; protection of personal privacy and software copyrights; and wariness of conflicts of interest and improper vendor relationships. "Information is power, and CIOs have an ethical responsibility to ensure that power is not abused," says Gary Edwards, president of the Ethics Resource Center in Washington.

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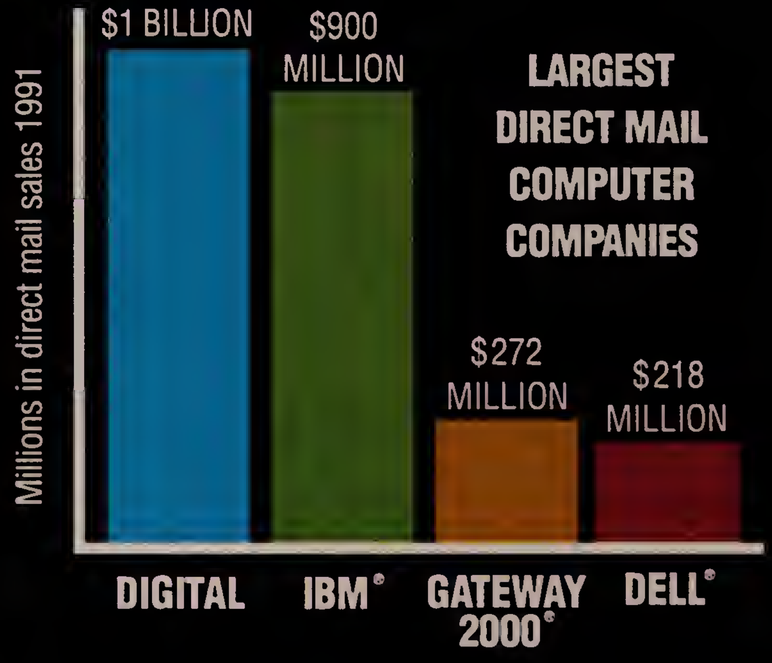

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> — Richard Heckinger, Hong Kong Stock Exchange

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> — *PC Week*, October 5, 1992

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> **"I think they're a winner."**
>
> — Andrew Seybold, Editor-in-Chief
> *The Outlook on Professional Computing*
> August 24, 1992

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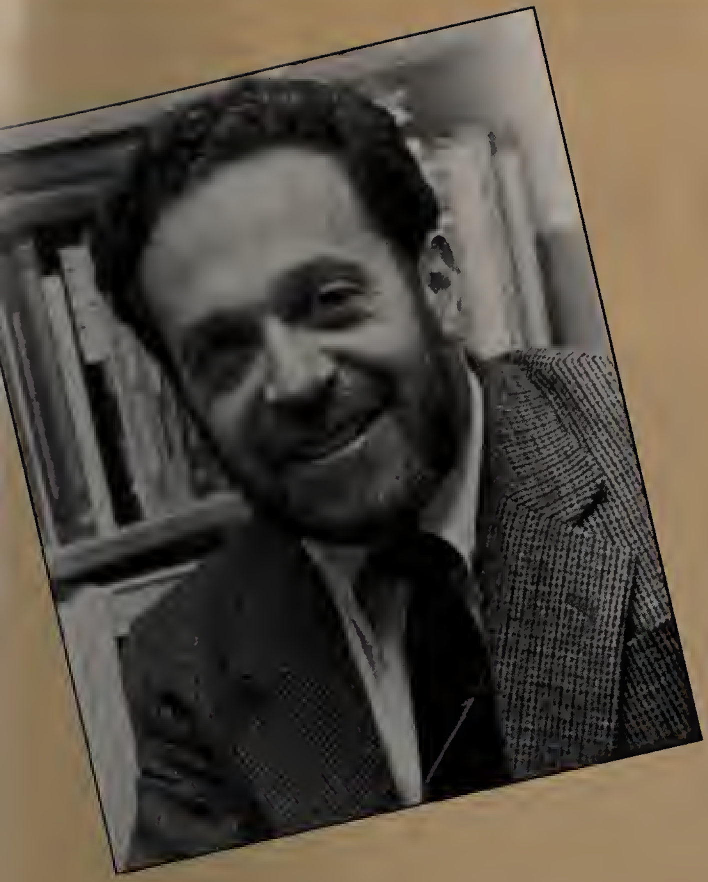

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Kennedy School of Government
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TRENDLINES

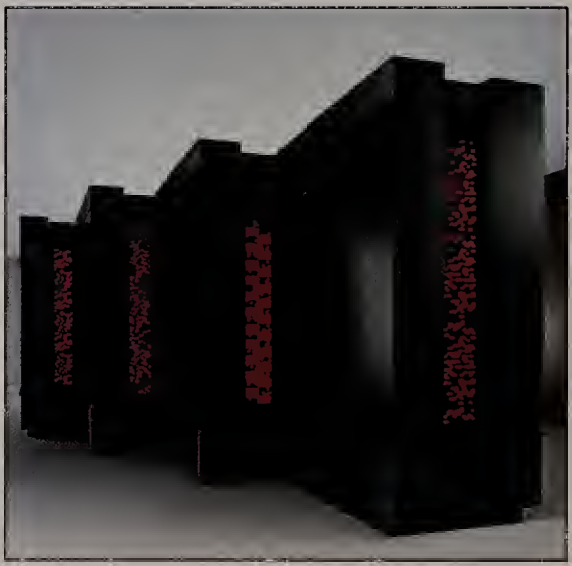
SUPERCOMPUTER DESIGN

ART FOR TECH'S SAKE

What is this, a data center or somebody's kitchen? The mainframes look like blue refrigerators, the minis and servers resemble beige trash compactors, and the PC clones are so many microwave ovens. But computers don't have to look like kitchen appliances. A few years back Steve Jobs broke the clone mold by styling his NeXT PC with a shiny black magnesium case, and the latest crop of notebook PCs includes award-winning designs that perfectly dovetail form with function. Now builders of the biggest boxes of all—supercomputers—have joined this stylish vanguard, bringing a sculptor's touch to bear on sheet metal, rivets and light-emitting diodes.

One notable example is Thinking Machines Corp., a massively parallel supercomputer maker in Cambridge, Mass. In designing its latest and largest box, the firm employed the consulting talents of sculptor Maya Lin, who designed the "black wall" Vietnam War memorial in Washington. The goal was to fashion a casing for the Connection Machine CM-5 that would elegantly convey its great power—one trillion computations per second—without being intimidating or oppressive.

The most striking feature of the CM-5, unveiled last year, is its zigzag shape, reminiscent of a staircase lying on its side or a flopped-over ziggurat pyramid. This configuration has a practical as well as an esthetic purpose: Since the CM-5 is scalable from 32 to 1,024 processors, the horizontal stacking design accommodates the addition of processor modules.



While making concessions to facilitate operator access, the designers took pains to hide unsightly seams and sliding panels. The CM-5's exterior is devoid of company logos and operator controls. The only adornments are rectangular panels of cascading red lights reminiscent of the flickering dashboard of Han Solo's Millennium Falcon. While a few of these lights serve as diagnostic indicators, most are there to convey that something vital is happening inside this multimillion-dollar monolith. (Hoping to compete on price as well as esthetic appeal, Thinking Machines recently introduced the CM-5 Scale 3 system, which has a starting price of $750,000.)

For those who do opt for the CM-5, the toughest question might be where to place it in the data center. It might look nice next to the dishwasher, but then it would clash with the Frigidaire.... ▬

DON'T LEAVE HOME WITHOUT I.T.

If you're lousy at folding maps and prone to leaving Michelin guides on planes, the burgeoning selection of electronic travel guides may make getting away from it all a little easier. And a lot more expensive.

***The Wall Street Journal* reports that Zagat's restaurant and hotel guides, which provide a patron's-eye view of establishments in 35 major cities, are coming out on floppy disk for $99 a city. The Fodor's series from Advance Publications will soon be available on software for handheld computers. And Official Airline Guides, a unit of MacMillan Inc., is publishing flight schedules on diskette and CD-ROM at a cost of $214 and $149, respectively, for an annual subscription.**

The Zagat surveys, available on software from Axxis of Haverford, Pa., are called CityGuides. They allow travelers to request information on establishments meeting very narrow criteria (Southwestern vegetarian near a subway station; a formal sushi bar with handicapped access). They also provide a route for getting there, using a little green car that travels across the computer screen.

Another advantage of the electronic guides—people studying their portable computers look less like tourists than do people lugging around maps and pocket guidebooks. And the less you look like a tourist, the less likely the natives are to be rude. ▬

DEVELOPING DEVELOPERS

According to the Strategic Outlook on IS personnel in this issue, "if current university enrollment levels remain steady, no more than 3 percent of the class of 2000 will have majored in computer and information science. Roughly half of these will be foreign nationals, most of whom intend to take their new knowledge back home."

Concerned by this trend, Computer Associates has announced a $250,000 scholarship program for undergraduate computer-science students and called for other high-tech companies to launch similar efforts. "Like other companies we're dependent on development talent," said CA Chairman Charles B. Wang. "Without new leaders, software development is going to stagnate."

Under the five-year New Leaders Scholarship Program, up to 50 participating universities will nominate outstanding sophomore and junior computer-science students. Each of the finalists will receive a PC and selected CA software and be eligible to intern with CA development teams. The 10 winners will be awarded $5,000 each. ▬

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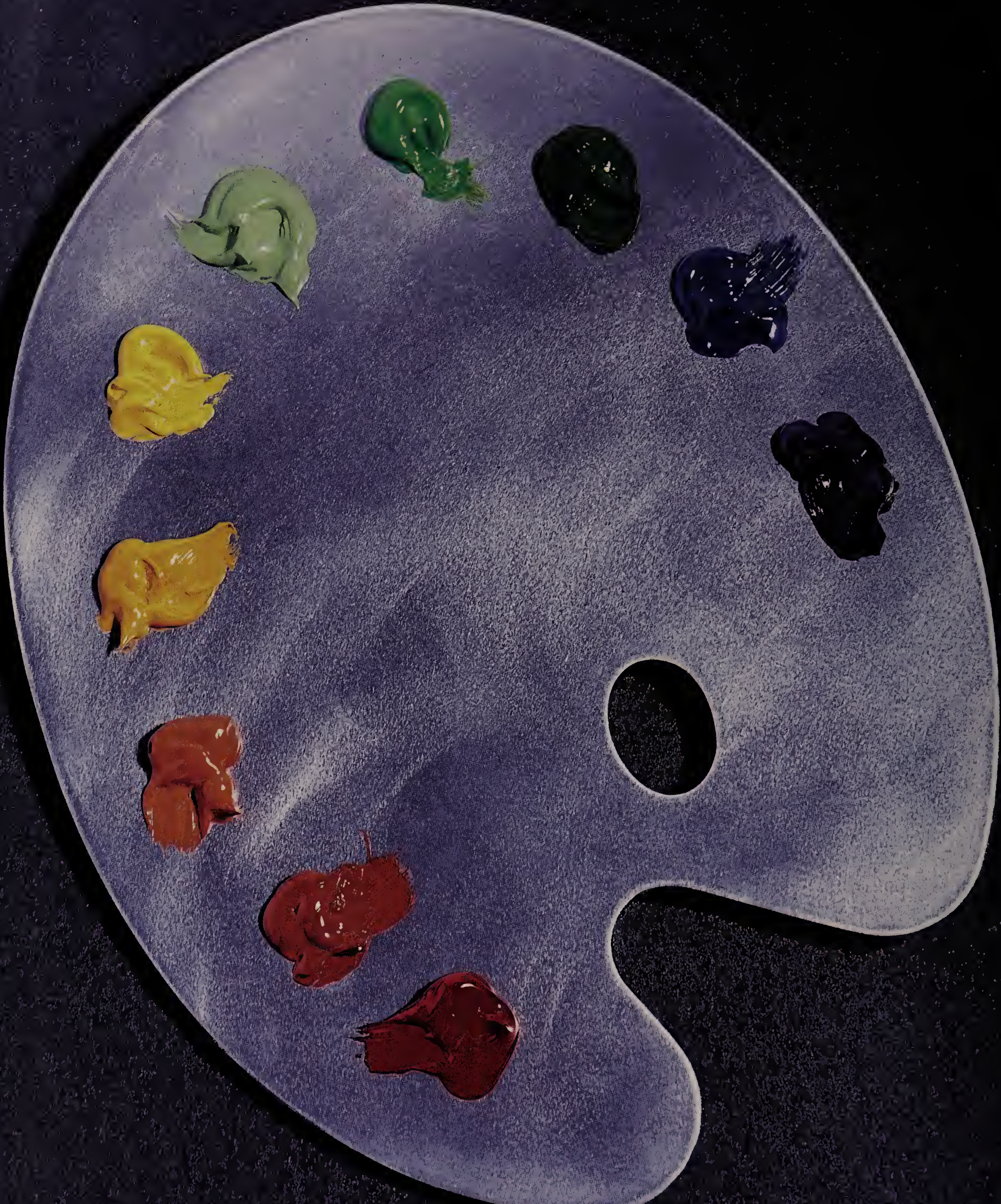

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TRENDLINES

PARKING-ENFORCEMENT MANAGEMENT

LOVELY RITA—WITH TEETH

Two years after Chicago reengineered and automated its parking-ticket collection processes, city administrators are beaming—ROI is running at about 350 percent. Meanwhile, parking scofflaws are singing the blues.

Before implementation of the new Parking Enforcement Management System, responsibility for collecting parking fines was divided among the city, the county and the courts. Violators could beat tickets by delaying court dates or simply ignoring them. Records were divided among bureaucracies, error-marred and cumbersome. Only 10 percent of fines were collected in the year they were issued; only 25 percent, ever.

Then in 1990, Chicago consolidated parking under the city's control. Violators no longer go to court to contest tickets, but to one of four hearing sites managed by the Chicago Department of Revenue. The city also hired EDS to put together a technology package for managing ticket information.

The resulting system—managed by EDS under a five-year outsourcing contract—integrates 50 different technologies. Parking enforcement aides now write tickets using hand-held computers (the information is downloaded into a mainframe-based ticket database). The hearing sites are linked to each other and to the central database, as well as to other information. For instance, if a scofflaw argues that a ticket is unfair because the meter was broken, the hearing officer can tap into a parking meter maintenance database to check. Also, the Sun Microsystems workstations at each hearing center are linked to a database of images representing handwritten tickets. (About two-thirds of all tickets are still issued by police officers and written by hand; EDS also imaged the backlog of two million uncollected tickets.) By viewing the original ticket, a hearing officer can resolve any mixups caused by rekeying errors.

A geographic information system linked to the ticket database provides intelligence: Where do the most egregious violators park? Can parking be changed to enhance traffic flow? Where are the parking hot spots?

EDS charges the city about $7 million to $8 million annually and gets a million or two more through contingency fees from the collection of backlogged tickets. But Chicago's parking ticket revenue has jumped from $30 million to $65 million annually, said John Holden, a DOR spokesperson. About 60 percent of all tickets issued are now paid, and because officers can more easily determine whether a vehicle is owned by a repeat offender, booting is up. Revenues from parking meters are up, too, and traffic flow has improved on some streets. ■

ILLUSTRATION BY JAMES KACZMAN

EDI EDIFICATION

EDI's role in reengineering payment systems will be the subject of the 1993 Corporate EFT/Financial EDI Conference being held in Chicago in May. Co-sponsored by the University of North Carolina's Kenan-Flagler Business School and the Electronic Data Interchange Association (EDIA), the sixth annual conference will address electronic funds transfer (EFT) and financial EDI, the fastest growing segments of the general EDI movement, according to EDIA President and CEO Greg Harter. The conference is the largest program of its kind in North America, said Harter, and is designed to educate corporate executives about the integrated use of EFT and EDI to move payments and financial information between trading partners. For more information about the conference, contact EDIA in Alexandria, Va., at 703 838-8042.

And for those of you who can't get enough information about EDI, a special edition of *EDI Forum* on legal and audit issues is available from The EDI Group Limited in Oak Park, Ill. ■

THE BOOK STOPS HERE

There are unquestionable pleasures in browsing leisurely through an antiquarian bookshop—but when it comes to ordering business books and videos for a corporation, the faster, simpler and cheaper the better. Busy executives and corporate librarians looking for a one-stop solution to book-ordering need look no farther than Dick Weigen's house in Sutton, W. Va.

More than 500 companies nationwide order from Weigen, whose Corporate Book Resources was built on the premise that busy people don't have time to shop among the country's 14,000 publishers or write hundreds of individual checks for the books they order. Customers simply contact Weigen by phone, fax, computer or mail and tell him what they want and where to send it. He prepays their order and frequently can ship it from his warehouse or from the publisher within 24 hours. Weigen says that eight out of 10 books are in his customers' hands within two weeks, compared to the three or four weeks that is normal for publishers. He keeps his prices low (he doesn't charge for freight, postage and handling) by keeping inventory low—no more than $100,000 worth in his New Jersey warehouse.

Most of Weigen's orders are for business and technical books. But he also obtained 100 copies of *Green Eggs and Ham* for a company that wanted to change the thinking of management. ■

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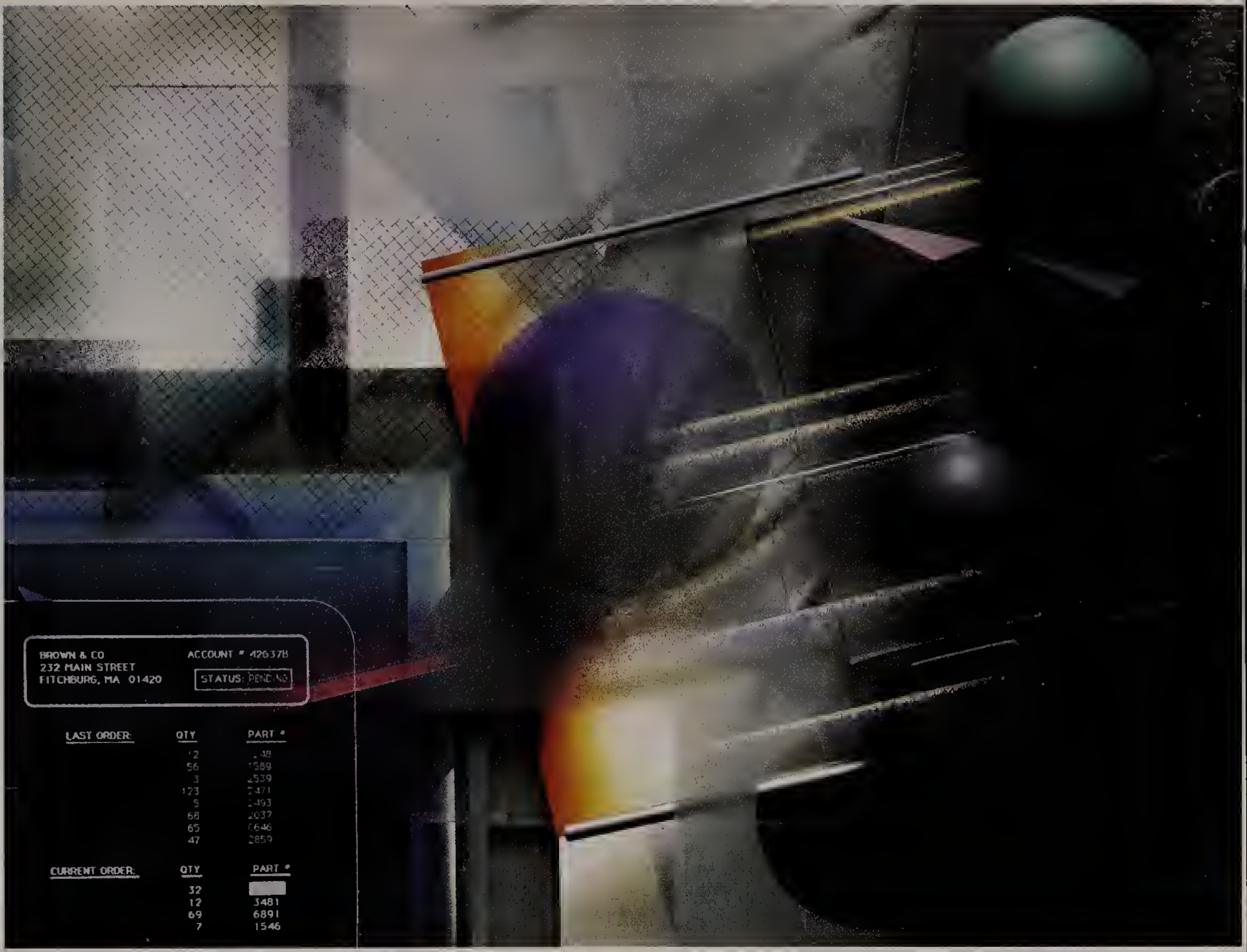

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TRENDLINES

SPIN-DRY DOCTORS

Unless you happen to be Long John Silver or puppeteer Shari Lewis, there's nothing more forlorn and useless than a single sock, whose mate has been spirited away by the nefarious washer/dryer syndicate. Buck up though. It may not be long before computer technology takes up the search for these AWOL argyles.

Solon Automated Services, a $100 million Philadelphia-based firm, has designed a management information system to monitor coin pilfering and mechanical irregularities in its 178,000 coin-operated washers and dryers. The system briefs Solon officials daily with reports on who's stealing from the coin box, which washers are giving freebies and which dryers are rotating erratically.

Solon hopes the IBM AS/400 system will give it an edge in this saturated market. While there are no immediate plans to address the sock crisis, developer Jim McDonnell hopes the system will someday help identify which machines need repair before they break. OK, if it can't find the missing socks, can it at least nail those slobs who don't scrape off the lint screens?

PLANT SAFETY SYSTEM

WHEN DISASTER STRIKES

The 1990 Clean Air Act requires users and makers of chemicals to minimize the risk of a hazardous-materials accident, respond quickly and effectively to spills and leaks, protect employees and local communities from disasters, track the movement of hazardous materials and analyze their own response effectiveness. Some of these regulations are being addressed by a new plant emergency system designed by Environmental Response Systems Inc. of Horsham, Pa., which allows operators of chemical and paper plants, petroleum refineries and nuclear power stations to respond to spills and leaks with military efficiency.

PlantSafe is a rules-based expert system that makes emergency information instantly available to plant operators. This information includes meteorological conditions that might exacerbate a leak, precautions that need to be taken when hazardous materials are involved, and maps that detail land contours and power and sewer lines. PlantSafe also suggests appropriate responses to a given situation based on the recommendations of experienced operating and safety personnel.

A subsidiary of Pacer Systems Inc. of Billerica, Mass., Environmental Response Systems based PlantSafe on Pacer's work in developing emergency-response systems for the U.S. Navy. Tested at Rohm & Haas and Bristol Plant, two chemical manufacturers in Bristol, Pa., it is designed to handle incidents of any magnitude, from a minor operating glitch, such as a sewer-line problem, to a major environmental hazard.

Using a mouse, plant operators can simulate the effects of wind patterns on gas leaks, for example, or call up information about proper protective clothing. They can even retrieve the phone numbers of individuals who need to be notified if an emergency situation develops.

The PlantSafe system goes into operation automatically, alerting response-team members when a plant's alarms begin to sound. Workers at the scene use handheld transmitters to send data back to the computer for analysis. The system keeps a timed log throughout the incident for better analysis. While it is most useful in real-life emergency situations, PlantSafe also makes a good training system for plant operators.

MEMBERSHIP HAS ITS PRIVILEGES

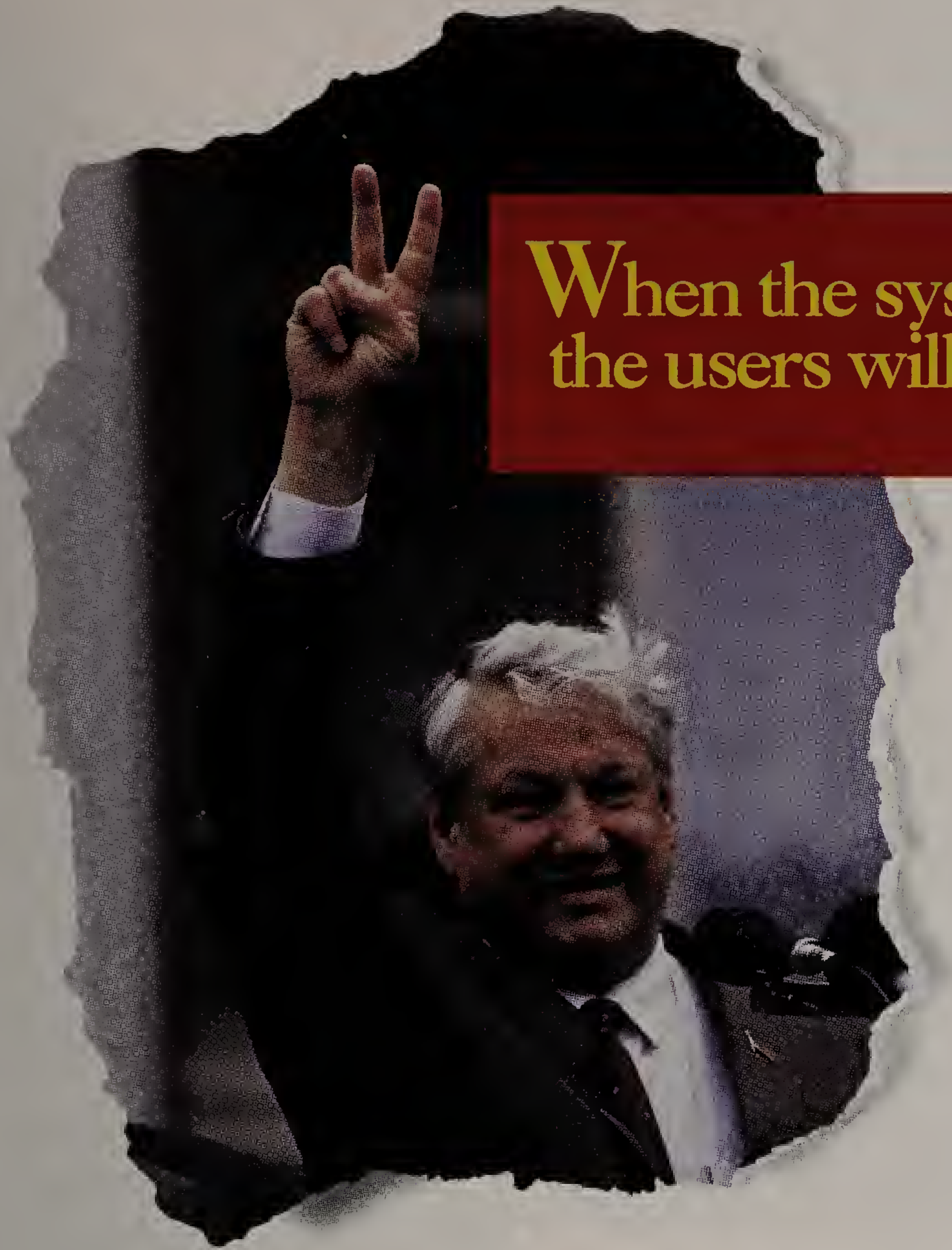
Organizations unsure of how to get started in distributed computing now have access to a real-life laboratory for large-scale distributed services based on the Open Software Foundation's Distributed Computing Environment.

The University of Michigan's Center for Information Technology Integration (CITI), an applied research and development center working with corporate and government partners to expand and disseminate technological expertise, is offering affiliate memberships to interested organizations. The CITI distributed-computing project will enable an estimated 20,000 students, faculty and staff on a variety of computing platforms to interconnect and access resources across the campus and around the world. CITI staff are also developing network modeling and management tools for large-scale networks, researching the potential of mobile computing and investigating video-imaging technologies.

There are three levels of annual membership. For $5,000 affiliates get a 20 percent discount on CITI courses, attendance by two staff members to the annual affiliates meeting, CITI's technical reports and newsletter, access to the interoperability lab during hosted events, and the opportunity to meet graduate students experienced in distributed computing. On-site visits may be arranged for an additional fee.

For $15,000 the course discount is 30 percent, four staff members may attend the annual meeting, and the organization is entitled to one week of on-site visits. For $25,000 there's a 40 percent discount, six staff members can attend the annual meeting, and two weeks of on-site visits are allowed. For more information call 313 764-5440.

PHOTO BY COMSTOCK, INC.© 1992; ILLUSTRATION BY JAMES KACZMAN



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TRENDLINES

DOMESTIC-VIOLENCE DATABASE

AN ASSAULT ON BATTERY

Sometimes, terror has a familiar face. In Massachusetts so far this year, more than 30 women and children have been murdered by alleged batterers—their husbands, former boyfriends, fathers. Often the victims had good reason to suspect that these men—with a history of stalking, beating or otherwise terrorizing them—might be waiting for the opportunity to inflict greater harm. Recently, the Commonwealth has taken steps to offer these women greater protection, using technology as one of its principal weapons.

Massachusetts has created a computerized registry of domestic-violence information designed to improve judicial and police response to restraining-order violations. Early last September, a database provided by the Probation Department began transmitting domestic-violence complaints, plus protective and abuse-prevention orders from several courts, to the state's Criminal History Systems Board (CHSB). The database contains the history of civil restraining orders and is available, along with criminal records, to all judges and police agencies.

Information on new restraining orders is now sent electronically each evening to the CHSB, which makes it available online through the Law Enforcement Agencies Processing System. "Previously we had some pitfalls in our information delivery," said Charles McDonald, a spokesman for Thomas C. Rapone, Massachusetts' secretary of public safety. When a woman received a restraining order, "it was printed out on paper and eventually made its way through the courts and to the police. But there would be delays, and they could have tragic results."

The new system provides timely data to 101 court locations and 260 police sites. As a result, if a woman receives a restraining order in the afternoon and a threatening phone call that evening, the police can respond immediately. Judges called after hours can determine whether an individual is violating a restraining order and issue a warrant without delay.

The system should also help protect police by giving them more information before they enter a potentially dangerous situation. Fifty percent of injuries to police officers nationwide occur during domestic disputes, McDonald said.

A second database stores information on people who have already violated restraining orders. This "hot file" contained nearly 800 active warrants only a few weeks after it was established.

ANSWERING ANDREW

With Hurricane Andrew bearing down on South Florida, American Airlines relied on expert systems to quickly make plans for diverting planes and passengers out of harm's way. Once the storm subsided, the technology was also used to get the company's planes back in the skies.

American's Sabre Computer Services Division has developed many expert systems to manage the business problems caused by situations such as hurricanes. "With more than 600 aircraft and 2,650 flights a day, the impact that bad weather presents is not just localized to a single geographic area," said Thomas J. Kiernan, president of Sabre. "Our entire flight schedule and crew and equipment allocations are affected."

The knowledge-based Maintenance Operations Controller Advisor (MOCA), for example, reacts to flight-schedule disruptions caused by cancellations, diversions or delays and recommends optimum routing. When Andrew struck, MOCA was able to determine in minutes which flights were the most important to divert for passenger safety and aircraft-maintenance purposes. A few years ago, such a decision would have required two employees working up to eight hours.

After the hurricane, many Miami-based crew members were unable to return to work. To keep the airline operational, American's Res-Crew expert system assessed the availability of reserve crew and allocated employees based on flight times and qualifications.

PHOTO COURTESY OF AMERICAN AIRLINES

NEW VENTURES

JCPenney, GTE Spacenet and Capital Cities/ABC are teaming up to provide communications to the retail industry. The joint venture, called Advanced Retail Communications, will deliver television, audio and data services to major shopping and other retail locations through a combination of digital satellite broadcasting and a terrestrial transmission network. Operations of the venture—which will be supported by providers of information processing services, programming and equipment—are slated to begin in 1993.

RF Data and RAM Mobile Data have formed an alliance to provide wireless data communications to public-safety organizations. RF Data's computerized state and national crime database-access system, combined with RAM's national wireless data-communications service, will enable public-safety officers to access federal, state and local law-enforcement databases directly from their vehicles.

Bell Atlantic has entered the network-integration market with the formation of a new division based in Frazer, Pa. Bell Atlantic Integration provides a range of services including initial planning and analysis, product integration, network implementation, post-implementation support and education. Initially the division will focus on large-scale, complex enterprise networks at major corporations within Bell's operating region.

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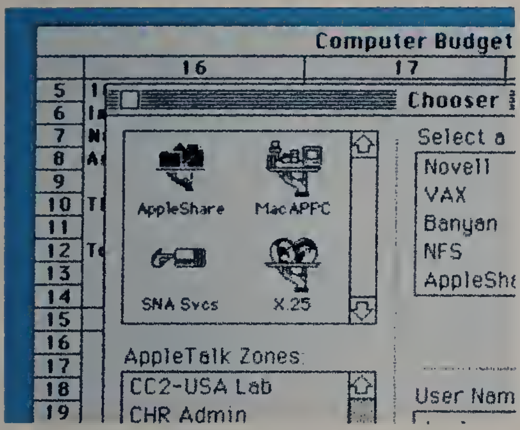

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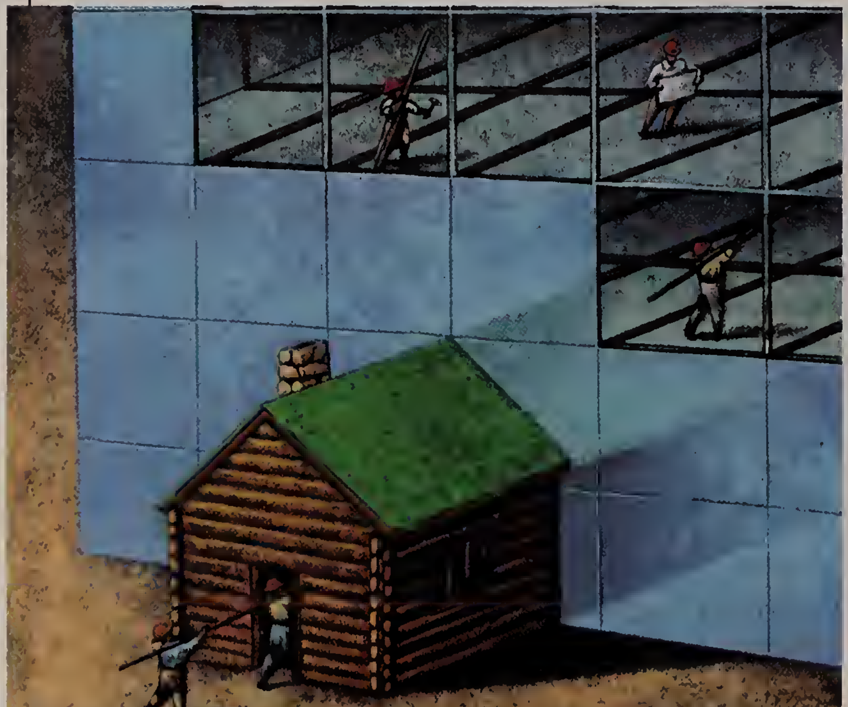
A Dual Approach

CIOs who can mitigate the rigidity of existing software infrastructures while developing long-term plans for more fundamental change will help their organizations garner the fullest possible benefits of business-process redesign

BY LAURENCE J. BEST AND FRED L. FORMAN

Business-process redesign (BPR), also known as business or work reengineering, is having a dramatic impact on corporate organizational structures. Companies that have experienced BPR success and failure alike have discovered that their application software infrastructure is an important BPR concern. Paradoxically, while software is a basic enabler of BPR, the fragmented, inflexible application software infrastructures that exist in most large organizations today are a major impediment to achieving immediate benefits from BPR.

Creating a software infrastructure that is integrated, flexible and robust will most certainly make BPR much easier to accomplish. However, large-scale software development can be expensive and time-consuming, and there is no guarantee of success. While some organizations have indeed reengineered their business processes by totally replacing their software infrastructures, the scope of the required systems-development efforts has often delayed BPR initiatives for several years.



Business managers must strike a balance that provides both near- and long-term payback. The optimal approach is to apply a dual strategy—a “coexistence” approach to facilitate immediate BPR opportunities coupled with an ongoing upgrade of the software infrastructure to enable future gains.

The experiences of a number of organizations show that it is possible to achieve BPR gains in the short run, not by replacing or ignoring a fragmented software infrastructure but by coexisting with it. These organizations created sophisticated interface systems that provide for the key system characteristics that enable BPR even while the detailed execution of business policy remains within older systems without these characteristics.

Implementing an integrated inquiry database is often the first step in creating a coexistence environment. This database consolidates current operational data about customers, products and business activities. It is particularly valuable for customer service; an integrated inquiry facility enables service representatives to find answers based on an enterprisewide perspective on the current customer and business situation.

In a properly designed system, all aspects of available information are readily accessible without special training. Access to information is based on natural information relationships rather than arbitrary system boundaries. For example, in older systems, accessing a record of bills sent to a customer requires users to log on to a billing system and find the correct online screen (out of dozens). An integrated inquiry facility can present a record of billings (and perhaps even an image of a bill) merely by exercise of an option to see billing information in greater detail. A workstation-based inquiry system for telephone support staff might interface with data from over a dozen mainframe-based systems to allow representatives to quickly get the information they need.

Another type of coexistence system is the front-end interface. This provides an advanced interactive (usually graphic) environment for integrated business processing. Beyond

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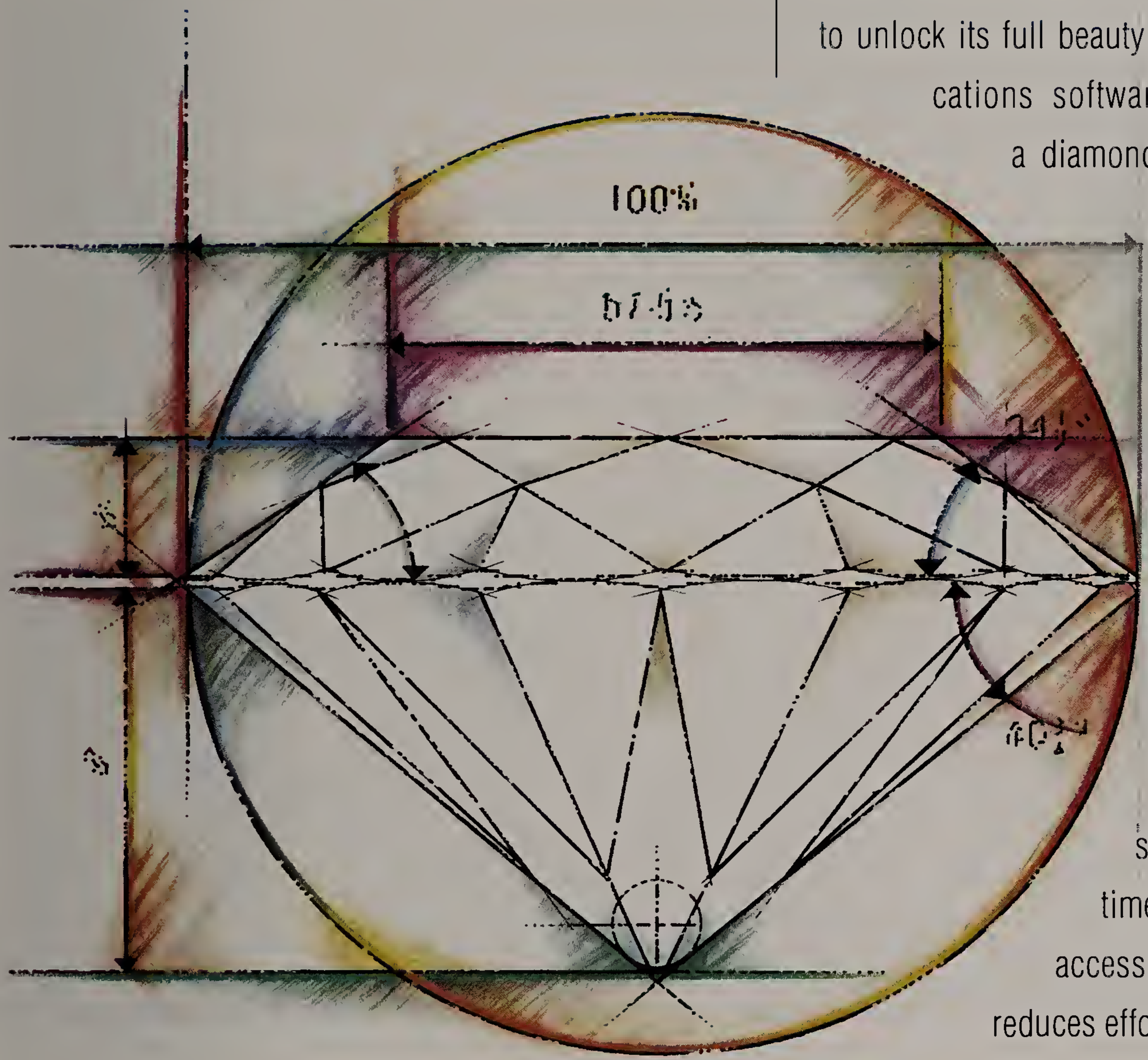

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merely accessing information, an employee, business partner or customer can initiate and complete comprehensive business transactions. All interactions with the system occur at a very high level. There is no requirement to know the details of each of the specialized systems maintaining different aspects of the customer relationship. Behind the scenes, the interface directs these systems to perform low-level functions like calculating charges and fees.

An "information warehouse" system can aid overall business-process management. It consolidates historical, archival management information across business functions, thus providing an orderly, architected source for decision-support data and enabling managers or analysts to readily explore business trends. Its database consists of daily "snapshots" of customer, product and business-process data. Since "snapshot" data formats are standardized across all business functions, reports and graphs can be created quickly and easily.

A coexistence strategy can be extremely useful in achieving BPR gains. BPR initiatives are perishable, and a project that takes too long to implement will likely not succeed. However, coexistence systems are ultimately stopgap measures. Even the most cunning interface cannot compensate forever for rigid, fragmented systems. The proper role of the coexistence strategy is to permit the earliest realization of BPR benefits. Then, going forward, the organization's next generation of software applications should provide native rather than add-on support for modern business-processing models.

Executing this dual strategy requires the following specific actions:

- Integrate awareness of software possibilities and impediments into BPR training and planning.
- Carefully consider coexistence approaches to support identified BPR opportunities before committing to software obliteration.
- Initiate technology-vision and software-design quality programs to influence user and developer expectations toward robust, flexible, integrated systems.

> *BPR initiatives are perishable, and a project that takes too long to implement will likely not succeed. However, coexistence systems are ultimately stopgap measures.*

- Establish an ongoing software-renewal program to phase out problematic systems, replacing them with systems that are broadly architected to enable BPR possibilities.
- Organize the search for BPR opportunities as an ongoing effort rather than a one-shot panacea.

In designing application software for the long haul, IS executives should ensure that it embodies the following characteristics:

Integrated: There are no arbitrary constraints to linkages between enterprise business functions and data (this applies even to unanticipated linkages). Data and processing are not locked into specialized software applications but can be readily accessed based on business need.

Robust: The software application implements a comprehensive model of the business, even when all aspects of this model are not immediately exercised. This includes functionality common to most businesses as well as to a specific business. Thus, there should be robust facilities supporting such common business activities as transaction processing, workflow and inquiry.

Flexible: Any requirement for significant programming to implement a BPR scheme puts that scheme at grave risk. The ultimate solution is for software to be so flexible that changes can be accomplished quickly and with minimal programming. For example, advanced banking applications can permit a bank to support a new loan offering merely by setting values in tables defining key loan variables.

Intuitive: An employee or customer, having worked briefly with a system, will be comfortable with a wide variety of functions. Each function appears as an intuitive arrangement of standard online features. This is an important BPR support issue because workers performing redesigned business processes typically use a wide range of online functions.

Portable: Any business function can be centralized on mainframes, decentralized on downsized hardware, or both centralized and decentralized at the same time. A workstation and mainframe working together on a single business transaction is client/server computing.

Continuous: The software application's design does not require periodic shutdown of business processing. Unexpected outages are rare and, when they occur, short. This is important because BPR can create new requirements to support a business process across time zones and processing shifts. Also, the reliance of redesigned business processes on information technology can make system outages extremely expensive.

Architected: The overall structure of the software environment transcends any particular information technology. Thus, new business or technology opportunities can be seamlessly integrated as they arise. This is analogous to classical architecture; architects are trained to understand structures in a way that transcends any particular building technology.

One of the most significant lessons of business-process redesign is that software can no longer be treated as an implementation afterthought. Software possibilities have become an important component of business possibilities, and many executives are becoming proficient in applying software technology to business. Ultimately, addressing software as a business issue rather than as merely a technology issue is key to fully realizing IT's promise. CIO

Laurence J. Best is a principal at American Management Systems Inc. in Arlington, Va., and author of Application Architecture: Modern Large-Scale Information Processing. *Fred L. Forman is an executive vice president at AMS.*

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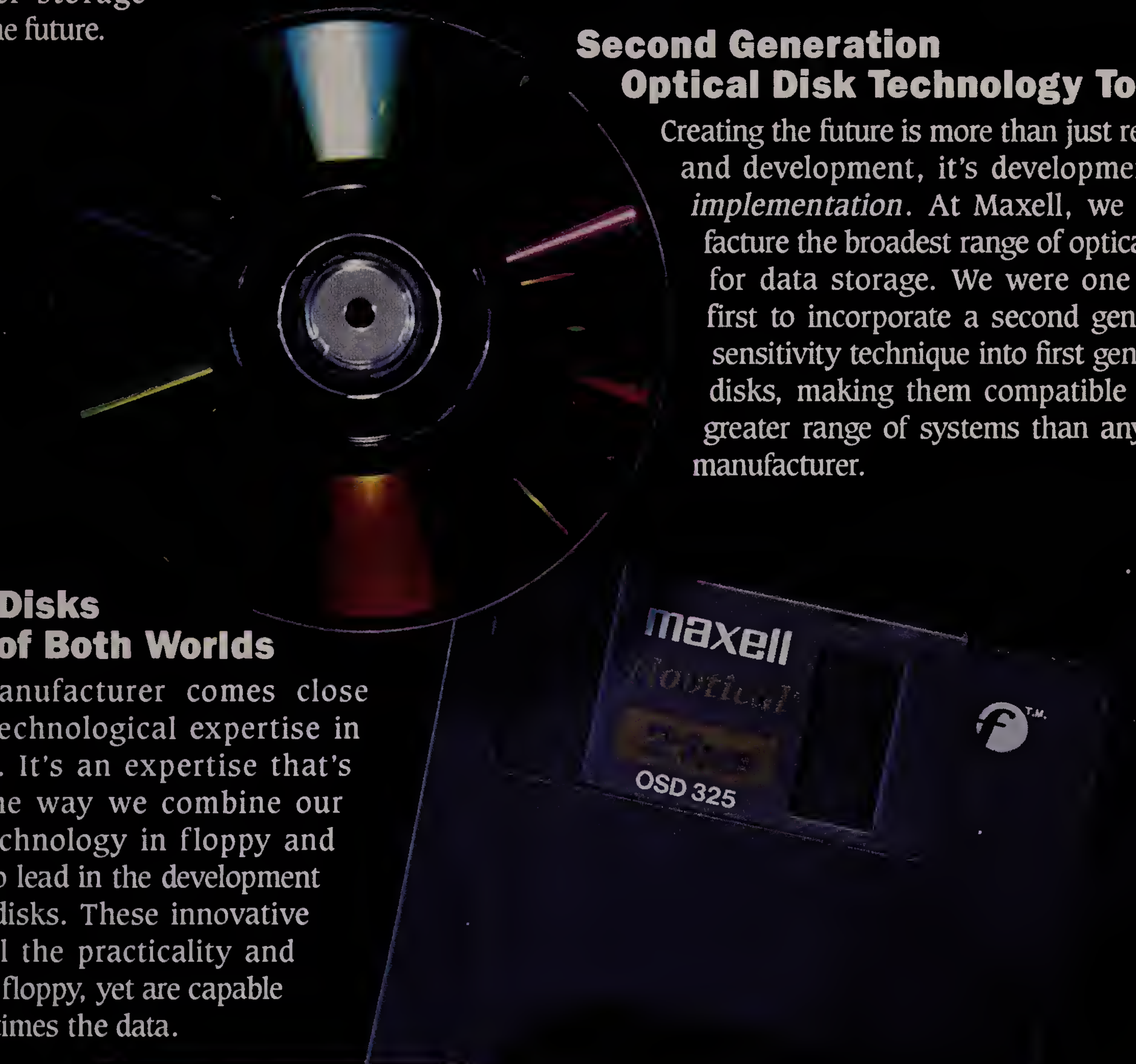

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Magnifying the Problem

At Hallmark Cards, standard metrics weren't providing an accurate picture of how well IS was servicing its customers. So the department decided to put its performance under a microscope.

BY JAMES R. JOHNSON

In early 1990, the data center at Hallmark Cards Inc. in Kansas City, Mo., embarked on a mission to accurately measure all service disruptions. Like other large IS shops, we had been using industry-standard metrics that did not reflect the level or quality of our customer service. Our strategy was to develop a report that magnified the problem beyond what customers could detect—like a microscope magnifies its view. Thus if we passed the scrutiny of the microscope, we would exceed user expectations. The result of our efforts, "The Good Day Report," sets goals well beyond user expectations and makes other corporate service reports obsolete.

Our computer utility offers online service in production transaction-processing (called Customer Information Control System, or CICS, in the IBM world) and time-sharing options (TSO). On the central computer are nine CICS regions serving thousands of Hallmark employees using different applications, including finance, marketing, order-processing, customer service and E-mail. On an average day, two million online transactions are processed between 8 a.m. and 5 p.m. The TSO network averages 250-300 customers during this time. The major service metrics for both transaction-processing and TSO are availability and response time.

One week in February 1990, four serious problems occurred, resulting in 105 minutes of documented downtime. However, at the end of the month, our report indicated that we had achieved 99.7 percent availability. Researching this inconsistency, we found that 70 minutes of the downtime was due to problems that disrupted availability for only some customers and thus did not appear on the monthly report.

Such discrepancies made us skeptical that our existing metrics were giving us an accurate picture of what our customers were experiencing. So we created and mailed a user-satisfaction survey in July 1990. The results: 59 percent of our customers said their systems were always available; 39 percent said they were usually available, and 1 percent said they were frequently unavailable.

Why would 39 percent of our customers say their systems were "usu-

PUTTING SERVICE DISRUPTIONS UNDER THE MICROSCOPE

DATE	**DEDUCTIONS**						**SCORE**	**RESULTS**
	IPL *(minus 10 points)*	**CICS Down** *(minus 1 point for each 0 to 3 minutes)*	**Database Down** *(minus 2 points for each 0 to 3 minutes)*	**Files Closed** *(minus 1 point for each set not open at 7 a.m.)*	**CICS Response Time Violation** *(minus 1 point for each violation/hour)*	**TSO Response Time Violation** *(minus 1/2 point for each violation/ 15 minutes)*	**100 Points minus points deducted**	
August 3	0	0	0	0	-1	0	99	Good Day
August 4	0	0	0	-2	-4	0	94	Bad Day
August 5	0	0	0	0	0	0	100	Great Day
August 6	0	0	0	0	0	0	100	Great Day
August 7	0	-2	-2	0	0	-1/2	95.5	Good Day

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© British Telecommunications plc 1992 2025-205B ally available" when we reported 99.5 percent average availability for the first six months of the year?

We found two answers. First, since problems were not spread evenly throughout the month, customers remembered the one or two days when a 30-minute disruption occurred. But these "bad days" were lost in monthly averages. Second, there were holes in the reporting system, since problems such as individual disk-drive failures were not reflected in the availability measure.

Another apparent discrepancy involved our response-time metrics. Hallmark's system-tuning efforts have produced subsecond response times for virtually all transactions, and we have consistently met the TSO service-level agreement promising a .2-second response time over the month. Yet the survey results indicated that 24 percent of the customers were not happy.

We needed a new reporting method, one that would let management know how many service disruptions were actually occurring and measure the impact of all such disruptions on our customers. We also needed to be able to rate our service, daily and monthly, against a standard. We wanted the report to be simple; quick implementation was important even if it required manual effort.

The Good Day Report" established six critical success factors for online service: computer downtime; database, online-file and CICS availability; and CICS and TSO response time. Console/help-desk analysts manually record the first four metrics, and we easily modified existing reports to track the two response-time measures.

Problems or time losses are logged to an online file, and every morning an extract program computes points for the report. Since the analysts see all the problems, there are no reporting holes; each service disruption is documented.

The heart of the report is a point system that measures problems by magnitude (what impact they have on the customer). We begin each day with 100 points. If we lose none, it is a great day. In a good day, no more than five points are lost.

We were delighted with the results of the first complete report, produced in December 1990. We achieved a "good" rating every day, with only 28.5 points lost during the entire month.

Our enthusiasm was short-lived. In 1991 we did not exceed 84 percent good days during a month, and our average was only 67 percent (168 good days out of a possible 251). Fortunately, the report was internal to IS, so we could ponder the implications among ourselves.

How does the microscope magnify problems? Note the response time rules for TSO. A half point is lost if, in any 15-minute period, average response time for 90 percent of transactions exceeds .5 seconds. Com-

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The heart of the report is a point system that measures problems by magnitude.

paring this to a monthly average half-second violation, the magnification is one-to-30,000. This is only one of the six independent metrics; the microscope magnifies all disruptions.

When the microscope is turned on, monthly averages cannot hide daily and hourly fluctuations, CICS regions are monitored individually, all disruptions are considered, and the effect on users is measured. This offers a significant improvement over traditional systems of measurement.

Over the next six months we worked to integrate "The Good Day Report" into the entire IS organization. We began by trying to understand and correct the causes of daily point loss. Performance analysts modified their activities by monitoring proactively, relying on real-time tools to avoid surprises. After-the-fact research was eliminated.

A few months later, project managers were asked to begin documenting the point losses for their areas of responsibility in a monthly report. We then assigned the capacity planning group responsibility for the monthly and yearly analysis of all these reports. Finally, line managers were asked to use "The Good Day Report" as their reference of record on downtime. Thus, by focusing on the critical success factors, the report becomes a manangement tool to improve performance: The 1992 year-to-date percentage of good days is up 7 percent over 1991.

Network metrics are not currently included in "The Good Day Report," but they will be soon. Managing the network as well as the computer utility requires proactive real-time tools. Customer phone calls should not be the first notification of a problem. For this reason we are reviewing new software tools continuously.

Responsibility for the report and its content is spread over a number of groups both inside and outside of IS. Computer Operations console/help-desk analysts enter data from their observations and the two response-time reports. Technical Services monitors and corrects most software-related problems. Systems Development, Data Base, Network, vendors and customers may also be involved in creating online disruptions—and their solutions.

"The Good Day Report" establishes a new paradigm for quality service, setting goals that exceed customer expectations and making existing reporting practices obsolete.

James R. Johnson is director of the data center at Hallmark Cards Inc. in Kansas City, Mo.

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KARATE SHOP

How a Long Island-based maker of display terminals came home to America and used an innovative shop-floor system to strike a blow for U.S. manufacturing competitiveness

JOE JOY WANTS TO KICK YOSHIO SAKURAUCHI'S BUTT. Sakurauchi, you may remember, is the Japanese parliamentary leader who remarked last January that American workers were too lazy to compete in the global economy—and that America had become little more than Japan's subcontractor.

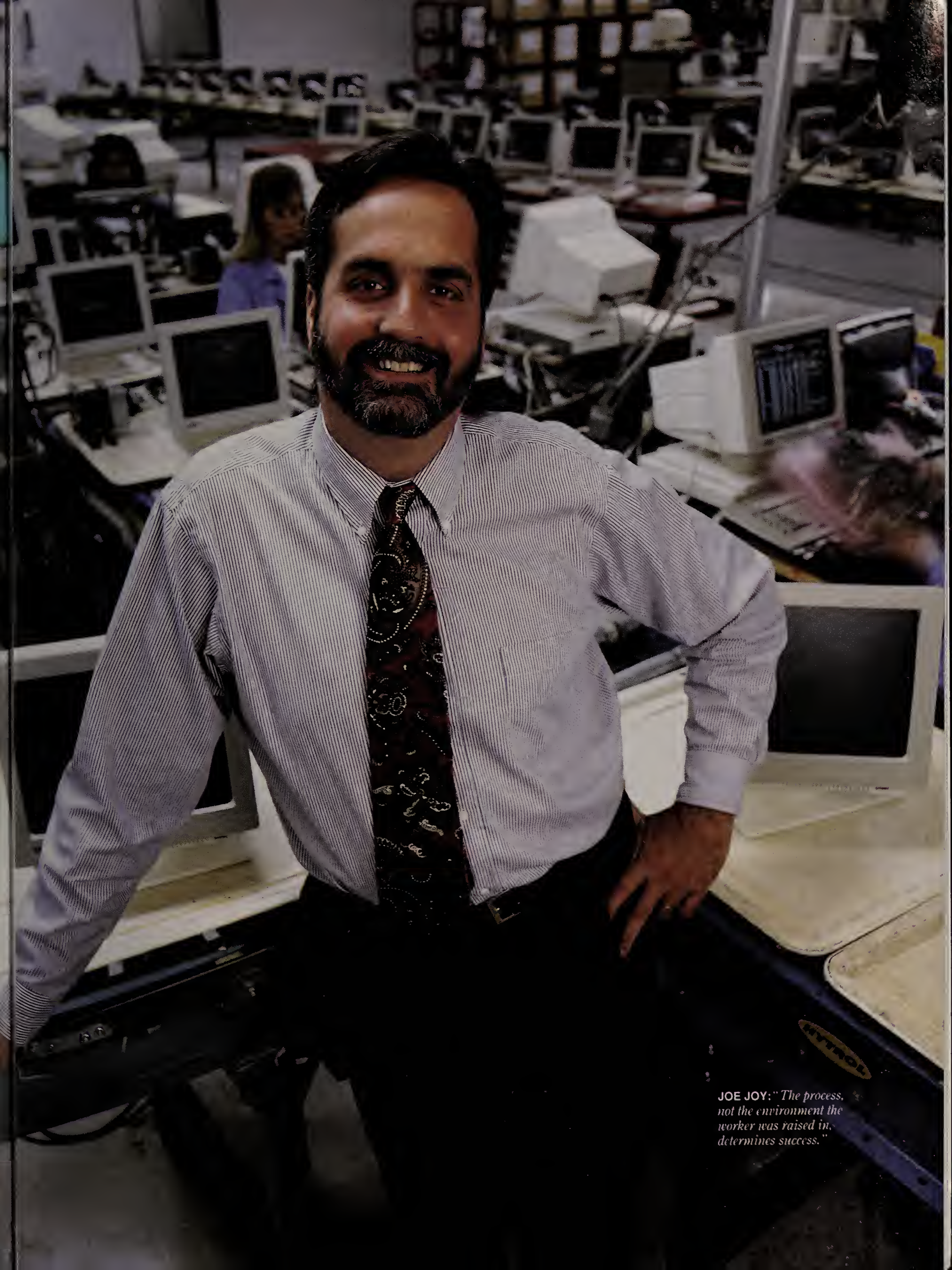
"I told [my PR firm] that I wanted to take out a full-page ad in the newspaper. I wanted to invite him to come on over, set up shop next to us, and compete with us product for product," recalled Joy, general manager of the displays division at Applied Digital Data Systems (ADDS) Inc. of Hauppauge, N.Y., a manufacturer of computer terminals—including alphanumeric, alpha windowing and X-terminals, as well as PICK-based systems. "I wanted to say, 'Go ahead and try. We'll kick your butt.' "

Cooler heads at the PR firm convinced Joy that such an advertisement was needlessly provocative, and it never ran. But months later, Joy brings it up anew with a visiting writer. The garrulous Joy is still steamed because he is convinced that Sakurauchi is dead wrong. Empowerment, quality practices and technology—not national labor pools—will separate winners from losers in competitive markets, he believes.

Unsurprisingly, his company's manufacturing operations embody Joy's view: Just a short stroll down the hallway from his office is ADDS's cavernous shop floor, where workers garbed in blue smocks preside over U-shaped assembly lines. Trained in a variety of assembly tasks—so that they can pitch in wherever necessary—and imbued with the quality creed, the largely unsupervised workforce keeps an eye on the quality of the products coalescing on the conveyors. If workers spot something troubling, they shut the line down and address the problem immediately. A manufacturing information system helps workers to manage the operations and to be scrupulous about quality. Striding across the busy shop floor, Joy emphasizes that his company's New Age vision is still evolving, but he is convinced that ADDS's shop-floor formula will beat any competitor, anywhere in the world.

BY THOMAS KIELY

PHOTOGRAPHY BY KENT HANSON



JOE JOY: "*The process, not the environment the worker was raised in, determines success.*"

His conviction stems from ADDS's contrasting manufacturing experiences at home and abroad. A division of Dayton, Ohio-based NCR (now owned by AT&T), ADDS abandoned its U.S. assembly operations in the early 1980s in favor of contract manufacturing (essentially outsourcing) arrangements in Taiwan and South Korea. The move shaved labor and supplier expenses but raised problems with product quality and timely delivery. In 1990 ADDS brought its manufacturing back home. Instead of the traditional assembly line it once had, ADDS built a just-in-time operation, adopted a rigorous quality program and changed the way employees labored at the company. These days ADDS is churning out twice as many units with one-fifth the labor as it did in the early 1980s. Products are also of higher quality, and ADDS gets them into customers' hands much more quickly than it ever did with old-fashioned operations, at home or overseas.

OUT WITH THE OLD, IN WITH THE NEW. At the now-reconfigured ADDS, the alpha and omega of competitiveness is flexible just-in-time manufacturing. Quality, empowerment and information technology are the rites, culture and language of JIT.

GEORGE MUNSON: *The system increases production and flexibility.*

"The process, not the environment the worker was raised in, [determines success]," Joy asserted. With this dictum in mind, ADDS is staking its future success on the new manufacturing system sitting on the factory floor.

"The Flex System," as it has been dubbed by the company, links workers to each stage of the product-assembly process and to a spate of quality checks. It also gives empowered workers and managers better control over the ebb and flow of operations. Designed in-house (it runs, of course, on an NCR box), the Flex System is ADDS's process rendered in code. And it's not your father's factory floor.

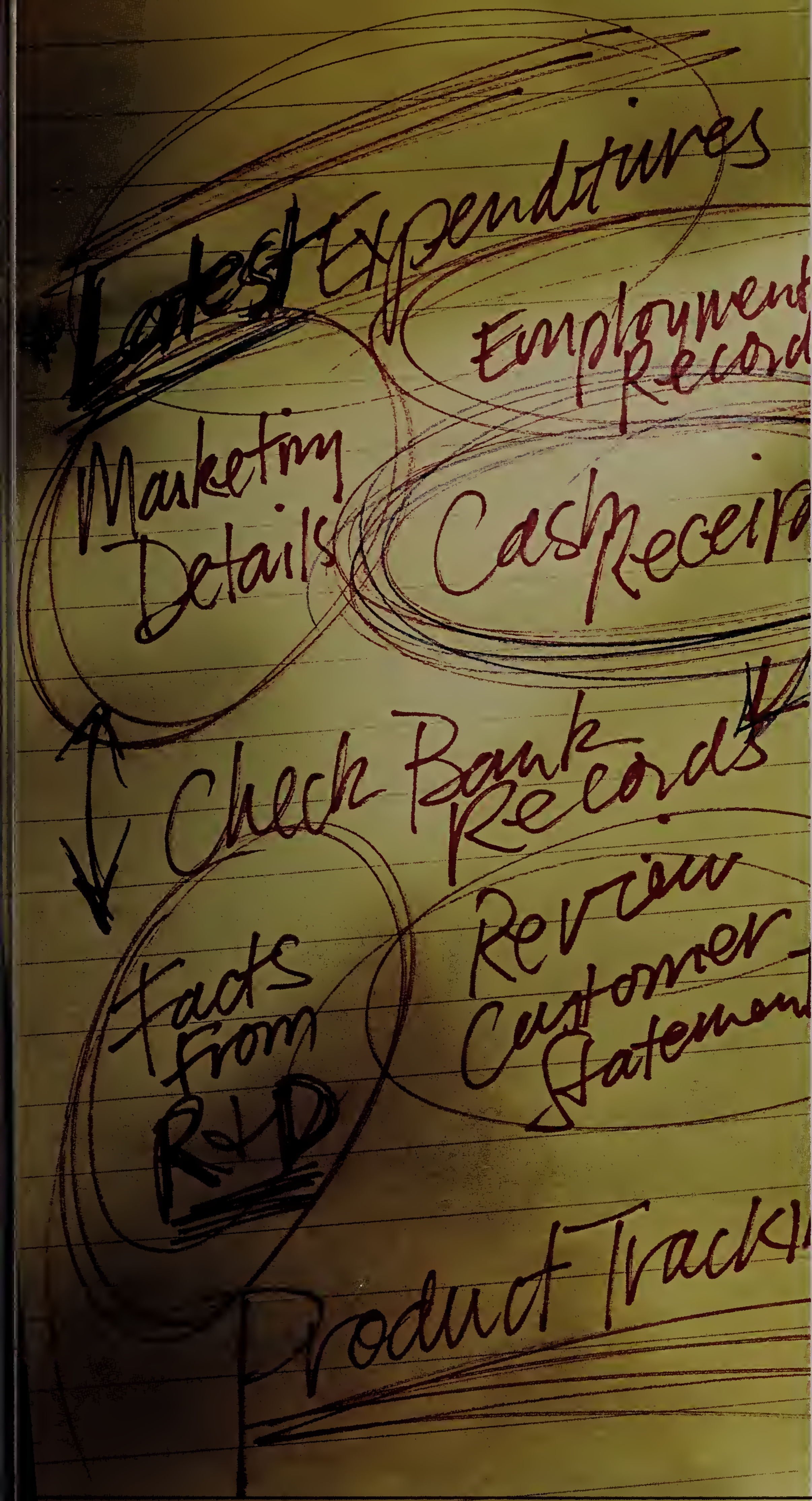
THE CONTRAST between ADDS's old and new manufacturing methodologies is instructive. On the face of it, the move to Asia should have been fruitful. In the early 1980s, Asian component suppliers were 25 percent less expensive than U.S. suppliers, and labor was much cheaper—$7 to $8 a day in wages. But the manufacturing system provided by foreign outsourcing partners was the same old assembly operation ADDS had left behind, and the cost savings the company had expected proved ephemeral. Delays in redesigns, expensive inventory backups and quality problems—common manufacturing snags, now exaggerated by distance—plagued the company.

By 1987 ADDS was an unprofitable basket case, and NCR seriously considered selling it off. But a core of ADDS managers persuaded NCR instead to back a dramatic overhaul. Essentially, the managers argued, they could win in this market by moving high-quality, customized products to customers quickly. That meant abandoning past manufacturing processes.

Out with the old, in with the new. At the now-reconfigured ADDS, the alpha and omega of competitiveness is flexible just-in-time manufacturing. Quality, empowerment and information technology are the rites, culture and language of JIT. For instance, components that are of low caliber (or that are improperly installed) will bring the workflow, as it is configured at ADDS, to a halt; quality practices and a well-managed supplier program are a must. Empowerment at ADDS means that managers expect workers to be diligent defenders of quality.

The Flex System links workers to each stage of the process and to quality initiatives. It helps workers track the steady progress of assembling components into products and then putting them into cartons, ready for shipping. While managers decide what work must be accomplished that day and load the information into the application, the Flex System itself calculates the flow of work and inventory on the assembly floor.

The ADDS process works like this: Each station along the product assembly line is outfitted with a bar-code scanner and a terminal and keyboard linked to the Flex System. As a unit rolls along the line, each worker scans a bar code affixed, in most cases, to a printed circuit board. (User manuals also bear bar codes that are scanned at later stages in the



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process.) Triggered by the bar code, the system displays the name of the customer for the particular product and the product's unique part number, by which it is indexed to inventory and billing data. The system also displays information about any customization that must take place at this stage of assembly. (ADDS makes about 6,000 different product permutations, including a mix of screens, emulation packages and keyboards geared to different languages.)

QUALITY IS BUILT INTO THE PRODUCTION PROCESS— and into the Flex System, which is programmed to catch errors. If an employee mistakenly installs the wrong chip on a customized board, the system cries foul.

DAVID McCRABB: *"Flex is the central nervous system of our operation."*

The Flex System has helped speed up production. ADDS can now pump out 700 to 800 terminals a day, bearing either the ADDS label or the labels of customers such as NCR, AT&T, Tandem and Sequent. "That can be 800 different products or 800 of the same product," said Director of Manufacturing George Munson. "We're flexible enough to handle it either way."

"The [Flex System] is the central nervous system of our operation," said David McCrabb, president and CEO of ADDS. "It keeps all the people involved [in the workflow] well informed, so that they can make good decisions—at every level of the organization."

Quality is built into the production process—and into the Flex System, which is programmed to catch errors. If an employee mistakenly installs the wrong chip on a customized board, the system cries foul. At some assembly stations, workers interact with the Flex System through menus to perform quality tests on the product. Moreover, if workers see problems that the Flex System seems to be overlooking, they have the authority to shut the line down.

Finally, the Flex System captures information at every stage of assembly. Some of this information—such as the time required for a given task—is used by the company for continuous-improvement drives. But it can also yield real-time status reports on the workflow—and will provide managers with trend- or failure-analysis figures and other quality reports.

Ironically, ADDS's IS group didn't develop the system; managers did. Tony Novellino, the company's vice president of operations and an architect of the new manufacturing system, recalls that in 1987 he and his colleagues recognized that an IS system would be critical to their vision. But IS wouldn't buy into it. "It was the not-invented-here syndrome," Novellino said.

Other ADDS managers echo Novellino's observation, but Bill Miller, vice president of finance and the man to whom ADDS's small IS group reports, offers a different perspective. IS balked at the plan, he said, because "they didn't feel they had the resources to take it on." (IS tends the company's other corporate systems, including financial, MRP and inventory applications.)

Instead, the management group conscripted a young programmer from the company's quality department to write the code. Today, says Miller, IS is slowly taking ownership of the Flex System.

The manufacturing process has changed at ADDS, and so have the measures that please bean counters. When ADDS built its products in Asia, manufacturing overhead as a percentage of throughput averaged 18 percent; today that figure is 8 percent. Inventory has been pared from an average of 80 days on hand to 23 days. Costs not related directly to products have been reduced by two-thirds. ADDS can ship product to customers in 24 hours. The NCR division is profitable once again.

And ADDS workers affix an American flag label to every unit they ship out the door.

EDITOR'S NOTE

With this month's "On Location" story, CIO *inaugurates a feature that, from time to time, will profile a corporate environment or process of particular importance to organizational performance. We'll look at the driving business factors and management strategies, and the supporting contributions of information technology. We invite readers to let us know if they work in an organization with a location we ought to visit.*

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hardware platforms are sers await proven, mission-are to run on these exciting ns.

WN-SIZING REND CELERATES

ill be needed is a way to integrate nnovative, new, cost-effective plat-s and technology with clients' exist-ystems and investments.

one can afford to walk away from past investment and start over. ouring hundreds of millions of dol IS systems for several decades, America is starting to demand ty from its MIS departments. Return On Investment) of IS difficult to measure and ssible to project. But still, ngful way to assess it must be found.

ne aspect of it that is easy to and that is the amount of n existing IS systems.

g back and adding up the ment in systems, training, development, etc., it's easy to ow much a corporation will andoning its current systems.

corporations who have under-s exercise, it can be quite a experience. It also puts in a w light proposals to scrap exist-ms. ■

INVESTMENT PROTECTION #1 PRIORITY

nany hardware and software ven-e proponents of "starting over" for us self-serving reasons, it is rarely a -efficient or rational move for clients.

nstead, prudent clients focus on evolu-onary technological advances, as pposed to revolutionary ones. There's o reason to throw away existing systems when there's always technology that integrate the old with the new.

I.S. PERSONNEL

THE HUMAN CONDITION

With so much news about so few jobs, it's hard to believe that an IT brain drain is imminent. But the demand for programmers and systems analysts is expected to grow by more than 70 percent in the next decade. At the same time, 23 percent fewer job seekers will be graduated, and no more than 3 percent will have majored in computer science. The brightest will flit from corporation to corporation spreading the pollen of technological change. Meanwhile, the less technologically nimble see their jobs threatened by a mainframeless future. CIOs who put off implementing a strategy for recruitment, development and retention are likely to undergo the sharpest of labor pains.

People Who Need People
Despite the grim outlook for IS professionals in a shrinking economy, those with the right skill sets remain in considerable demand. Without active intervention in staff recruitment and development, IS chiefs will find their departments struggling to meet corporate needs when the economy finally picks up.
Page 48

Improving Your Holding Patterns
Keeping talented people can be just as tough as finding them. Old-fashioned loyalty is just not in the cards these days, and even generous compensation packages may not be enough to hold together a first-rate staff in times of low morale and changing priorities.
Page 60

The Correct Carrot
Two forms of behavior highly desired by senior IS managers are the abilities to work as part of a team and to think creatively. Yet the system of rewards often discourages both.
Page 66

A Survivor's Story
Terry Marksberry could have become another former CIO when he decided to turn his company's IS services over to outsourcing giant EDS. Instead, Marksberry redefined his own role and became one of a new generation of CIOs.
Page 70

I.S. PERSONNEL

PEOPLE WHO NEED PEOPLE

Don't let the job drought fool you: When the weather finally changes, CIOs will be hurting for new talent. But the current upheavals and uncertainties in the field are turning the next generation of IS personnel away.

BY MICKEY WILLIAMSON

As if he didn't have enough to think about, Colin Crook, senior technology officer at Citicorp in New York, is wondering how he will find people with the skills to take the bank's information systems into the 21st century. Despite the well-chronicled grim outlook for IS professionals at all levels in a shrinking economy, those with the right mental set and collection of skills are in considerable demand.

"They're not easily come by, these people with what I'd term an enlightened attitude," Crook said. His strategy for meeting the demand for brain power is to hire those he can and retool from inside to make up the deficit. "We carefully recruit talent that can act as nucleating points for the new thinking and the new structure. At the same time, [we are] setting up [programs] to give our people the opportunity to change."

Without active intervention in staff recruitment and development, IS chiefs will find their departments struggling to meet corporate demands when the economy picks up. In the United States, 23 percent fewer job seekers in all fields will be graduated in 2000 than in 1990. Meanwhile, the demand for systems analysts will grow by 76 percent and the call for programmers by 70 percent, according to 1990 estimates by the U.S. Bureau of Labor Statistics. Those figures presage a sell-

ILLUSTRATION BY KEVIN HAWKES

er's market and a human-resource planner's nightmare.

Intensifying the demand is the fact that software has become ubiquitous. "Every product and every service provided by today's society depends on productive, high-quality information systems," writes New York-based management consultant Edward Yourdon in *The Decline and Fall of the American Programmer*. "An increasing number of manufactured products contain one or more embedded computer systems, systems that are software-intensive, with 100,000 or more lines of code. And though the term 'service economy' conjures up images of low-paid workers dishing out hamburgers at Burger King, today's service economy is information-intensive and would collapse almost instantly without smoothly functioning information systems."

IF CURRENT ENROLLMENT LEVELS REMAIN STEADY, NO more than 3 percent of the class of 2000 will have majored in computer and information science.

The smooth functioning of any computer system depends on the abilities of the people who fashioned it. "In information technology in particular," Crook said, "we are very susceptible to the quality and skills of individuals." A single software error, undetected, can halt the operation of a microwave oven, a bank's ATM network or a piece of manufacturing equipment. Experts have demonstrated that productivity, the sum of efficiency and accuracy, can vary between two IS professionals by as much as a factor of 10. That makes culling the most productive members from the pool of available talent a strategic ploy in itself.

Crook recognizes this and frets over the scarcity of university graduates to rise to the IS challenge. "What concerns me is the availability of skilled resources coming out of the universities," he said. "It's declining, which shows that the general population is not fired up about moving into this area." If current enrollment levels remain steady, no more than 3 percent of the class of 2000 will have majored in computer and information science. Roughly half of these will be foreign nationals, most of whom intend to take their new knowledge back home.

MBA programs with a concentration in information technology may some day provide the skilled professionals IS executives yearn for, but so far the presence of such people in the job market is nearly imperceptible, Crook said. Even if they were plentiful, however, Crook doubts they would have the requisite cognitive style for today's problems, let alone the problems that are likely to develop over the next 10 years. What's needed, he said, are "people with creative skills rather than pat formulas that have been trotted out by the business schools in the past.

"Business schools emphasize case histories," he explained. "It's not clear that the challenges of the '90s are going to be anything like those of the '70s or '80s. Some, in fact, are singularly different."

Reasons for the decline in popularity of information technology as a career choice are not hard to find. Hardly a day goes by without news of some company's restructuring leading to layoffs in its IS department. Any student with a relative or friend in the field has heard tales of frustration and pressure that are bound to raise questions about information systems as a career choice.

Part of the problem is the new role of the IS shop, according to Jeffrey Whitten, who chairs the department of computer technology at Purdue University in Lafayette, Ind. "The honeymoon is over," he said. "IS was always that wall over which [senior management] threw the bag of money, and they sometimes wondered what you got out of it. We are now expected to be an equal partner, which will force us to respond just as quickly to changing needs as our engineering counterparts. [Universities are] going to have to produce a new breed of student graduate to survive in that type of a world."

Purdue offers a bachelor of science degree in information systems. The curriculum balances technical courses with classes in business and industry, as well as in subjects such as ethics, organizational leadership and communication. Five years ago the program had a two-year waiting list. Now, Whitten said, "we have special programs within the department to be more aggressive in recruiting students and in contacting them when they express an interest in it." An interdisciplinary master of technology program will be inaugurated in about three years.

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MORALE "IS probably approaching an all-time low."
–Larry Constantine

There is a paradox here. IS professionals with the right set of skills are scarce and getting scarcer. But for those already in the field, the threat of termination has by most accounts sunk morale to unprecedented depths, particularly among those whose mainframe-only skills make them about as employable as a scuba diver in the Sahara Desert.

Ask any recruiter what computer skills are least in demand today, and you will hear a list of qualifications most often associated with mainframes and back-office applications. Peter Vosburgh, president at Marlborough Consulting Partners in Boston, mentioned as outmoded skills Cobol programming and anything having to do with proprietary computing platforms or nonrelational database systems.

Job anxiety is not confined to staff practitioners, said Linda Yarberry, who conducts nationwide searches for IS personnel for Management Recruiters of Austin, Texas. "Lots of top-level folks out there are scared to death they're going to be phased out," she said. "They're scared because they know there are very few positions out there that they can fill."

It's not that jobs for people with conventional mainframe skills have disappeared. "There are a lot of installed systems and applications which, unfortunately, are not going to change very quickly," Citicorp's Crook pointed out. "So we need to maintain a set of people that are suited to maintaining the status quo." Those are the people most likely to be fearful for their jobs and afraid to express their fears.

Fear of job loss is inimical to good staff morale, and morale "is probably approaching an all-time low," said Larry Constantine, an organization and systems consultant and founder of The Options Group in Acton, Mass. Although managers may not realize it, he said, "a lot of people are running scared. The cumulative effect of mul-

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The Great Communicators

Even technically adept employees may lack the most valuable skill of all—the ability to listen

Developing the ability to listen well and respond clearly may not be what computer professionals had in mind when they took their first jobs, but few can advance now without those skills. It seems almost unfair: No one goes into computers out of love for the uncertainty and ambiguity of human interaction. "There is growing evidence that the people who select...work in IS tend to deal with things by intellectualizing, dealing at a concrete level," observed Larry Constantine, founder of The Options Group in Acton, Mass. But the ability to ask penetrating questions, to listen to the answers and to keep coming back with more questions until every nuance of the user's requirements is clearly understood is key to systems work. The job is more like that of a consultant than a technician.

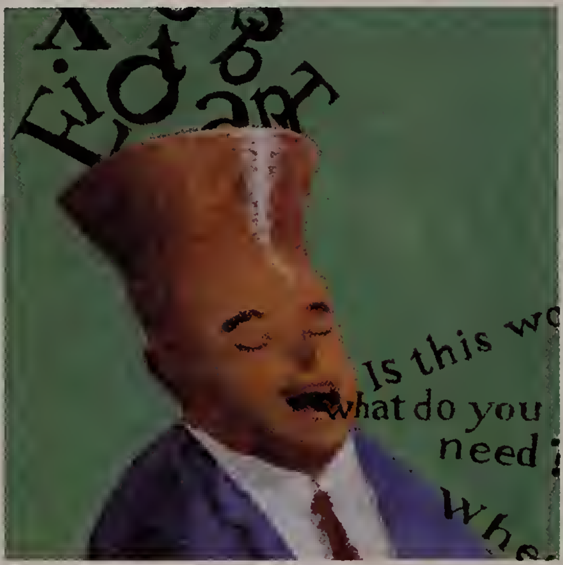

ILLUSTRATION BY KEVIN HAWKES

Lou Russell, CEO and a trainer at Russell Martin and Associates in Fisher, Ind., tells of one trainee who announced, "I just figured something out: I'm not qualified to do any of this stuff. What I learned in school was how to program, how to maximize the use of CPU cycles and write compilers. No one ever told me how to gather information from people or how to communicate with people, or what to do when I'm faced with changing priorities or conflict. That seems to be 80 percent of our job now."

Common sense says that it costs less to train existing staff than to replace them. Given adequate opportunity, said Russell, most people can learn the consulting skills that today's technology demands. "I don't think it's a two-day class, though."

"It's not magic," said Naomi Karten, founder of Karten Associates in Randolph, Mass. "There are basic skills that can be stated almost as a list. When people become more aware of what we mean by interpersonal skills, they begin to think about them for the first time."

–M. Williamson

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tiple downsizing [and] the fact that the job market is more difficult means that people are keeping some of their distress and unhappiness to themselves. It's going to surface more in the future."

Concern for one's job is only one reason for discontent in the information systems department, said Naomi Karten, founder of Karten Associates in Randolph, Mass., who lectures and consults on matters pertaining to end-user computing. "These are stressful times," she said. "Downsizing contributes both in its impact and in the changing technology." User-interface technology has made computer use easier for the nontechnical person, causing a shift in the balance of power between IS professionals and the people they serve. Working in information systems "loses some of its pizzazz" when end users can create their own applications, said Karten. "Gone are the days when IS people were completely in charge of all aspects of technology. It's hard to hold onto what has made a computer career something special."

> **"GONE ARE THE DAYS WHEN I.S. PEOPLE WERE COMpletely in charge of all aspects of technology. It's hard to hold onto what has made a computer career something special."**
>
> **–Naomi Karten**

Despite a limping economy, Marlborough Consulting's Vosburgh ticked off a list of skills for which there are always openings: network management, data modeling and database integration, cross-platform and client/server development, graphical user interface design, and aptitude in object orientation, CASE and fourth generation languages. Information systems professionals who know more than one language, particularly C and C++, and those familiar with Unix and the OSF/Motif user interface, rarely have trouble finding work, he said.

Not all the most desirable skills are technical. At Management Recruiters of Austin, Chris Frandsen, manager of the technical division, cited the demand for "people with analytical abilities who can go in and analyze business processes and apply technology to them. The need is for people with the interpersonal skills [required] to work with the client division in much the same way as a knowledge engineer would work" to gather information for an expert system, he said. (See related story, Page 52.)

Indeed, "the greatest cause of failure in the development of systems is the failure to adequately understand needs or requirements," said Karten. The growing popularity of rapid prototyping and iterative development makes skillful human interaction even more important.

"People must learn to step back from the immediate need, to gain a sense of the context in which the problem occurs, of the [user's] daily environment and problems," Karten said. The new role of the IS professional "is to help users see the options [and] gain a broader perspective on what they need and how they can benefit from technology."

Citicorp is just starting to think about retooling to meet the challenges of the '90s and beyond, according to Crook. Among the ideas under consideration is to define roles instead of jobs and then provide employees with the motive, means and opportunity to acquire skills required to fill those roles. Once trained, though, people must move right into a job where they can exercise their new abilities.

"It's no good having people become skilled in an area and then not giving them an assignment where they can practice it," Crook said.

From top to bottom of the organization, the most important attribute for IS professionals from here on will be flexibility. Companies can teach technical and interpersonal skills and create a climate in which people value cooperative work and feel safe in offering creative approaches to tough problems (see related story, Page 66). But no one can teach people to welcome change if they were born to be rigid. Yet to talk about information technology these days is to talk about change and the pressures that change implies.

"The rate of change of technology is running at 20 to 30 percent per annum," said Crook. "The way forward is to recognize that change has become intrinsic to our profession. In IS you are, in essence, a perennial student."

Mickey Williamson is a technical journalist in Warwick, Mass., who specializes in emerging technologies. She edits the newsletter "Case Strategies."

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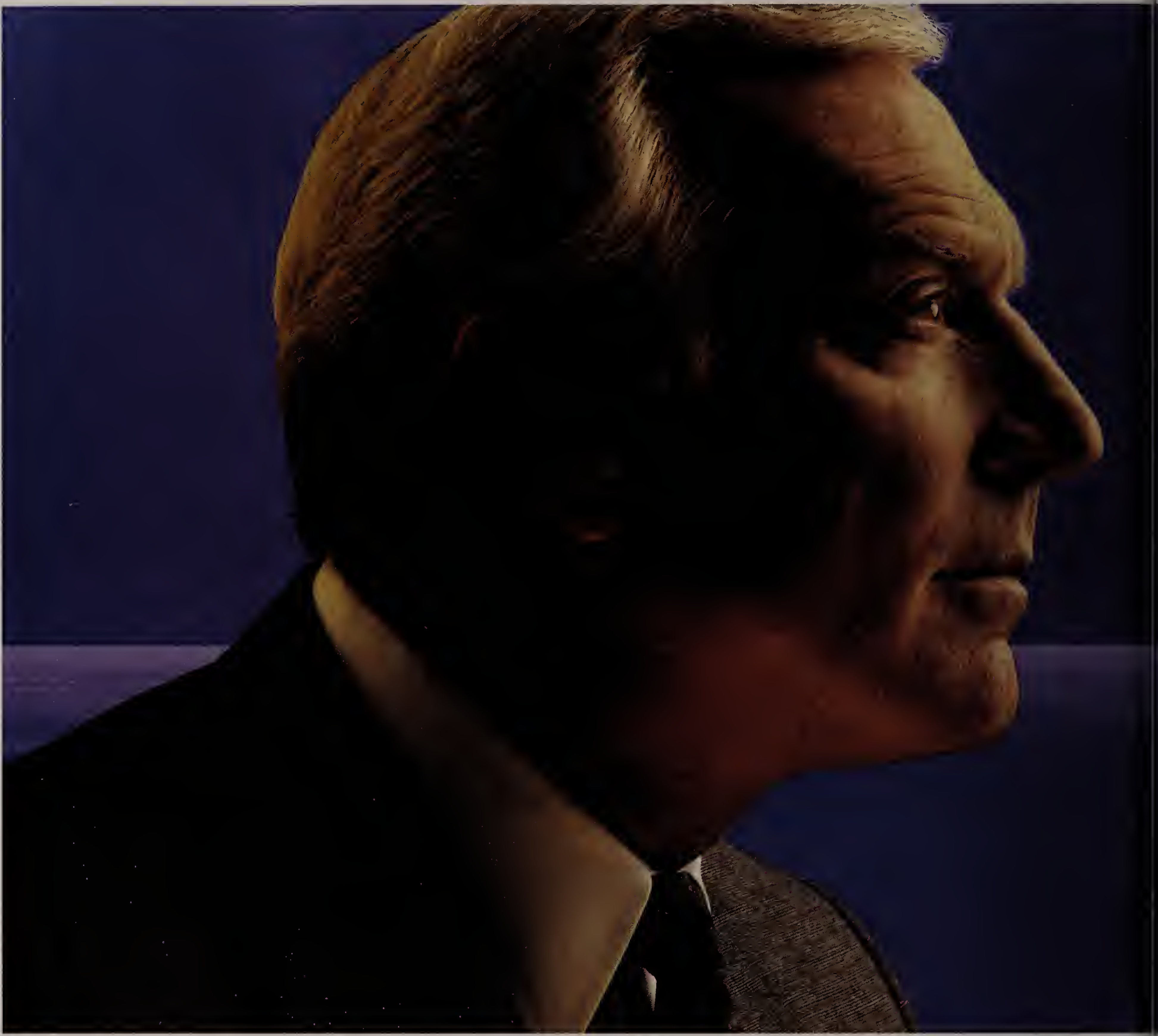

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I.S. PERSONNEL

IMPROVING YOUR HOLDING PATTERN

Once upon a time, employees signed on with a company hoping they had found a place to hang their hats for good. Today, CIOs trying to retain their best workers must cope with shifting loyalties, new priorities and sagging morale.

BY MICKEY WILLIAMSON

Finding and upgrading IS talent is only part of the problem CIOs face. Keeping those you'd hate to lose is just as hard. Good old-fashioned loyalty from those on the payroll is just not in the cards these days. Corporate restructuring and a downsized economy have seen to that. "People do not trust anymore that there is a rock-solid contract for lifetime employment with any enterprise," said Colin Crook, senior technology officer at Citicorp in New York.

Those who have effected technological change at one company are likely to receive blandishments from others. Management recruiters can tick off long lists of senior people who move among the nation's largest corporations like so many Johnny Appleseeds, scattering change. "People who have been successful implementing the new technologies are in demand," said Chris Frandsen, manager of the technical division at Management Recruiters of Austin, Texas. "The leading evangelists in new technology will move from company to company and start new groups." Those who move on may reach back into their old companies to recruit others.

Not even a generous compensation package for top performers can guarantee fealty anymore. Some companies offer a bonus for signing up the most attractive prospective employees, and then use it to keep them on the job, Frandsen noted. "I have seen sign-on bonuses that are paid out over a five-year period," he said. "If you leave before five years, you lose the bonus. It's not tied to performance but to your staying on board."

Increasingly, people change jobs for reasons unrelated to money. The quality of non-work life—over which no manager has even a shred of control—is gaining in importance, Frandsen said. He reports hearing often from people working in Califor-

ILLUSTRATION BY KEVIN HAWKES

nia's Silicon Valley who want to relocate and "are willing to compromise on salaries and position in order to find a better place to raise their families." The less desirable the environment, the more a prospective employer must offer in benefits such as family leave and health care.

Spending more on benefits may be good business. Employee turnover is expensive: Estimates range from 35 to 50 percent of the employee's annual salary, said Peter Vosburgh, president at Marlborough Consulting Partners in Boston, but he thinks it's higher. "I don't consider that a meaningful statistic, because it doesn't take into account the lost opportunity and disruption of the work cycle that are hidden and impossible to quantify," he argued.

Allegiance to the organization may be a dead issue, but a manager's personal credibility can sometimes replace it as the object of an employee's good regard. "I try not to make promises that I can't fulfill," said Michaela Laune, vice president in computer services at MediQual Systems Inc. in Westborough, Mass. "I think if you're honest and forthright with people, you build a personal loyalty."

"What seems to restore trust is an open sharing of information," said Larry Constantine, an organization and systems consultant and founder of The Options Group in Acton, Mass. "Managers need to share with their people everything that is available to them—information about plans, market strategy, financial picture, [even] real-

"PEOPLE ARE willing to compromise on salaries and position in order to find a better place to raise their families."
–Chris Frandsen

I.S. PERSONNEL

istic views of possible future downsizing."

To Crook, loyalty in the '90s is based on facts, not faith. "The loyalty we have to look for is a rational loyalty where people feel that the company is rational, its products are rational, it has a strong market position, and it is doing sensible things and is going to survive," he said. "That's how we have to appeal to people, not to buy them or try to persuade them to trust us. People in the trenches are amazingly aware of reality."

KEEPING GOOD people on board is a matter of "keeping them excited, motivated, rewarded and feeling good about themselves and their jobs."
–Doug D. Whittle

Keeping good people on board is a matter of "keeping them excited, motivated, rewarded and feeling good about themselves and their jobs," according to Doug D. Whittle, who heads the information center at Pioneer Data Systems in Johnston, Iowa, a division of hybrid-seed producer Pioneer Hybrid.

The company's MAD (Making a Difference) program encourages peer and management recognition of employee accomplishments. Since it's hard to feel good about an achievement that no one else recognizes, MAD was designed to help people "feel comfortable in letting their managers know they had done something worthwhile," said Whittle. Flying in the face of "the way most of us were raised, to think you should always be humble," MAD declares self-promotion acceptable if the achievement it heralds has contributed to the company's success. (See related story below.)

Whittle makes sure that his boss, Executive Director of Information Technology John Swanson, is aware of individual and group achievements: When someone receives a MAD award, he sends an electronic mail message to Swanson, often asking him to send a congratulatory message to the winner or to stop by his or her cubicle to shake hands. "I'm a firm believer in reinforcing behavior when you see something good happen, and in passing the message up," Whittle said.

To avoid employee burnout and recognize hard work, managers at Pioneer have the authority to give staff members time off when they deserve it. "I want my man-

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A Pat on the Back

When employees at Pioneer Data Systems get MAD, they get happy

A job well done is a reward in itself. But the approbation of peers and managers, together with such modest awards as a free day off, can go a long way toward improving employee morale.

Pioneer Data System's MAD (Making a Difference) program was designed to provide just that kind of boost. Employees are invited to nominate themselves, a peer or a workgroup. Doug D. Whittle, who heads the information center at Pioneer Data in Johnston, Iowa, a division of hybrid-seed producer Pioneer Hybrid, said the company was "looking for [accomplishments] that have made a difference for the information center, the [data systems] division, or Pioneer Hybrid as a whole."

Emphasis is on creative solutions to problems of end-user computing, "something that saved time and [therefore] dollars, or that spurred an end user on to become more independent or creative." Defining the payoff to the company is a must. "If all it's done is given them 15 more minutes for a coffee break, there's not a lot of payback there," Whittle observed.

Income tax considerations coupled with company policy restrict the cash value of awards. So instead of offering cash, the company might reward achievement with a coupon redeemable for a half day's vacation, to be scheduled by the recipient. This often means getting a head start on vacation and is the most popular award among employees.

Judging is done by a committee made up of Whittle, one of the managers who reports to him and two staff members. Whittle is the only constant member; the others rotate every quarter.

Awards are handed out at the monthly departmental meeting. Whittle said that giving staff an opportunity to applaud their peers has contributed to his goal of eliminating "any jealousy and one-upmanship."

There have been no nominations this year, and Whittle said the staff may have "outgrown" the program. But thanks in part to MAD, people now praise one another directly. "That's exactly what I want," Whittle said. "You want people to celebrate their accomplishments on a daily, ongoing basis."

–M. Williamson

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agers to be aware when somebody is on the short end of the stick here, to go to them and say, 'You've been working too hard. Take the afternoon off,' " Whittle said. "Pioneer is a great company that way. We have guidelines, not policies, so we have the freedom to do that."

Pioneer has also developed dual career paths throughout the company so that technical people can be rewarded financially and emotionally without having to become managers. One result, Whittle said, is that he can announce a project and ask for volunteers. "I can always count on at least a couple of people coming forward, no matter how busy they are, and saying, 'I'll squeeze it in somewhere.' " So high are morale and the drive to achieve, said Whittle, that once a manager told a group to take the afternoon off and they said, "Thanks, but we really want to finish this project."

Toni La Motta, principal of Toni La Motta International in San Diego, lectures and consults about employee morale and compensation. To boost morale and keep people motivated, she recommends "a three-pronged process of recognition." First is "appreciation, the day-by-day saying thank you for the job being done. But that's not enough."

Recognition also requires showing appreciation of the role that each person plays, with evidence that each is seen as more than just part of a team. "Typically, IS people like to see their ideas recognized. The way you tell them they're good is by using their ideas [and letting them know] their systems make a difference."

A closely related notion is that of acceptance, of knowing more about members of the staff than just what they do for a living. Organizations that work best are those where managers know the employees so well that they can dispense rewards to match particular interests, said La Motta. For example, someone who lives for golf might get the day off to play in a tournament in recognition of a job well done.

People respond best to recognition programs if they have a hand in setting performance standards and suggesting appropriate rewards for exceeding them. Terry Marksberry, staff vice president and director of information services for the Meredith Corp., a publishing conglomerate and media company in Des Moines, Iowa (see related story, Page 70), gathers ideas from the technical teams themselves. "Sometimes it's just a matter of having the chief come down with pizza and beer—give them personal time and recognition," he said. "Sometimes people feel more rewarded by a verbal pat on the back that shows you really know what they are doing, or a personal letter that goes to their home so their mate sees it. That often means more than any formal recognition."

Mickey Williamson is a technical journalist in Warwick, Mass., who specializes in emerging technologies. She edits the newsletter "Case Strategies."

"THE WAY YOU tell people they're good is by using their ideas and letting them know their systems make a difference."
-Toni La Motta

Finders and Keepers

- **Offer benefits that take lifestyle into account (home computer systems, flexible work schedules).**
- **Plan and publicize career paths that take into account differing cognitive styles and goals.**
- **Make morale a top priority. Be as open as possible with company information.**
- **Restructure commitments and reorganize workloads following departmental downsizing.**
- **Help layoff survivors deal with guilt and anxiety over possible future cuts.**
- **Invest in training, reward achievers and convey optimism about the company's future.**
- **Install a system of nonmonetary awards (wall plaques, time off, letters of commendation).**
- **Organize work around roles. Let people define their own titles.**
- **Beware of recognition systems that pit team members against each other. Give monetary awards to project teams and let members decide how to distribute them.**
- **Encourage people to acquire new skills; give them assignments that exercise those skills.**
- **Authorize people to take well-considered risks; let them know failure will not be punished.**
- **Provide an audience for complaints and suggestions.**

–M. Williamson

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I.S. PERSONNEL

THE CORRECT CARROT

Managers who misuse the system of rewards may inadvertently discourage the very behavior they want to promote

BY MICKEY WILLIAMSON

Anyone whose undergraduate studies included Psychology 101 understands the principle of reinforcing desired behavior by administering rewards. But the policies of many IS organizations ignore what individual managers know. Two forms of behavior highly desired by senior IS managers are the abilities to work as part of a team and to think creatively. Yet the system of rewards often discourages both.

Toni La Motta, principal of Toni La Motta International in San Diego, observed that "the only way to reward cooperative behavior is to reward the whole team. There is a lot of talk about working in teams, but often the rewards are given to individuals, who must therefore compete with the people on their team."

That does not mean that everyone on a team should get the same reward, she said. "It is possible to recognize that teams are made up of individuals with different talents, and that some people contribute more than others." La Motta told of an academic exercise where participants working on a team were given a sum of money to distribute among team members at the successful conclusion of a project. Team members readily agreed to compensate some more than others, recognizing that some people deserved more.

Another way to foster teamwork is to nourish group pride. Larry Constantine, an organization and systems consultant and founder of The Options Group in Acton, Mass., described a strategy used at an Australian firm to boost the job satisfaction of the IS group most often accorded the lowest esteem—the software maintenance organization. Because maintenance programmers themselves tend to think "they are the bottom of the totem pole," the company brought in a consultant to work on team building and fostering pride in their work. Increasing visibility was one technique the consultant brought into play; each time a bug was fixed, the maintenance programmer who did the work sent a memo over his or her own signature informing the programmer whose mistake was corrected that the code had been fixed. This made people aware of that employee's contribution.

"They also started doing both internal and external advertising for elite programmers, people who thought they were the hottest in the business and could work faster and be cleverer than anybody else," Constantine said. "They didn't actually hire anybody, but the very fact that these ads appeared helped build pride in the [maintenance] organization."

Today's IS professionals, particularly those engaged in redesigning business processes, need imagination. It's a rare individual who can look at the way things are done and come up with novel suggestions for change. "People tend to extrapolate from past experience rather than think creatively," said Colin Crook, senior technology officer at Citicorp in New York.

"IT SHOULD BE part of the corporate culture to foster risk-taking and to acknowledge that you'll blow it a certain number of times, but that it's OK as long as the wins outweigh the losses."
–Naomi Karten

Creative thinking involves taking risks, and managers often inadvertently discourage such behavior, even when they say they want new ideas. Part of the problem, Crook said, is that risk is typically defined as "something with a high probability of failure. I would prefer to see risk redefined as coming up with an unusual solution, where we don't necessarily know it's the right answer. There should be an explicit understanding of what we are doing, and why. Then if people fail, they should not be punished," as long as they did what they did for the right reasons.

"It should be part of the corporate culture to foster risk-taking and to acknowledge that you'll blow it a certain number of times, but that it's OK as long as the wins outweigh the losses," said Naomi Karten, founder of Karten Associates in Randolph, Mass. "People are holding back and not taking any chances at all," she said. It isn't easy to tell people not to be afraid of risk, especially in situations where "20 percent of the people in the group are going to be gone by next month."

She suggested that instead of speaking of risk, a manager might approach the task in terms of striving for greater creativity. He or she might say, "We need to accomplish [certain results]. Come back to me with 10 good ideas and let's do some creative problem-solving." CIO

Mickey Williamson is a technical journalist in Warwick, Mass., who specializes in emerging technologies. She edits the newsletter "Case Strategies."

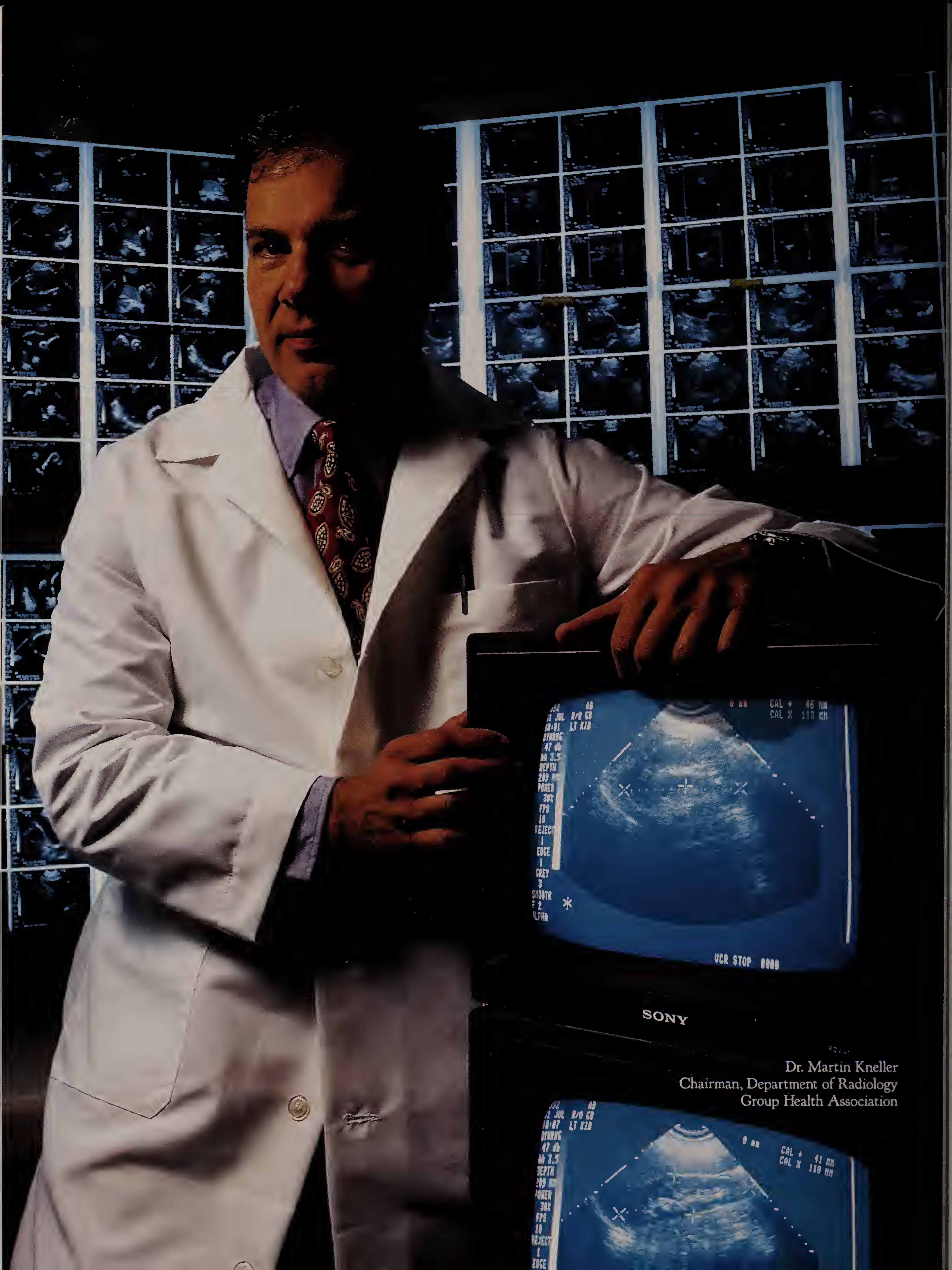
Sending the Right Message

Observers agree on the characteristics most wanted in IS personnel: creativity, flexibility, team spirit and loyalty. Here are some ways to reinforce desired behavior:

- **Creativity: Provide training in creative problem-solving and make 15-minute brainstorming sessions part of the corporate culture. Let people know you are considering their suggestions, even if you cannot implement them. Make it unacceptable for managers to take credit for the ideas of subordinates. Tell people that you appreciate their taking well-considered risks.**
- **Flexibility: Provide the tools and opportunity for people who want to do some of their work at home. Reward extra effort with the opportunity to develop new skills. Reward the acquisition of new skills promptly by providing assignments that exercise them. Give learning high value; attend training sessions yourself—and stay for the duration.**
- **Team spirit: Reward whole teams, not individuals, with pizza parties, picnics, time off, another challenging assignment. Let teams decide how to allocate monetary rewards among members.**
- **Loyalty: Let people create their own titles, reflecting what they do best. Treat people as though they are already the people you want them to be. Share as much as possible information about plans, goals, strategies, finances. Advertise and celebrate success. Thank people individually face to face. Send congratulatory messages to individuals at their homes, with copies to their managers and yours.**

–M. Williamson

ILLUSTRATION BY KEVIN HAWKES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I.S. PERSONNEL

PROFILE

A SURVIVOR'S STORY

For CIOs, outsourcing can open a one-way trap door or a door to new opportunities

BY MICKEY WILLIAMSON

Terry Marksberry could have become another former CIO when he decided to turn his company's IS services over to outsourcing giant EDS. Instead, Marksberry redefined his own role and became one of a new generation of CIOs.

Marksberry is staff vice president and director of information services for Meredith Corp., an $800 million media company in Des Moines, Iowa. (Meredith is publisher of 13 magazines, including *Ladies Home Journal*, and has a book publishing division, interests in cable and broadcast television, and the Better Homes and Gardens real-estate franchise company.) Aided by four highly skilled specialists, Marksberry manages what EDS does for Meredith, dictating standards, architectures, protocols and development platforms. The corporate technology team also controls Meredith's electronic-publishing and business-data network.

What Marksberry forestalled is what IS chiefs fear most: being escorted to the revolving door that is turning into a one-way trapdoor, according to Bernard Mathaisel, director of Ernst & Young's Center for Information Technology and Strategy in Boston. Turnover in the top IS post is legendary, and many who leave are not being replaced, Mathaisel said. He argues that the fault is not with the individuals but with the notion that a single individual can or should manage the information systems of an entire enterprise.

Mathaisel's concern is echoed by Jerry Kanter, executive director of the Center for Information Management Studies at Babson College in Wellesley, Mass. In a paper titled "Managing Information Technology in Turbulent Times," Kanter reported on interviews with senior IS executives in which they discussed the changing role of the information technology function. Among his findings was a "serious concern that a stint in IT might stigmatize the individual as a technician or specialist and not really... a candidate for general business management. Some feel that IT has gotten a bad rap ... as a problem area, most always underwater or at least trying to tread water in a dark and murky sea."

But Marksberry has bucked the trend that both Mathaisel and Kanter have identified. He has become Meredith's navigator, steering the enterprise through the choppy seas of technological change.

When Marksberry came to Meredith in 1989, the company had for several years invested little in information technology, allowing its skill base to atrophy and overlooking the need to synchronize IT strategies with those of the business.

Today the department doesn't look much different on the surface: A 50-member staff handles the day-to-day business of IS, only their paychecks come from EDS. Reporting to Marksberry, in addition to the

TERRY MARKSBERRY: A NEW INCARNATION

PHOTO BY NEIL MACDONALD

SNAPSHOT

Outsourcing Meredith Corp.'s IS services to EDS could have meant the beginning of the long goodbye for CIO Terry Marksberry. Instead he reinvented his role. Today he dictates standards, architectures and development platforms and helps to control the company's electronic-publishing and business-data networks.

staff director of the EDS operation, are a technologist, a strategic planner, a financial analyst who helps users build business cases and cost-justification for new development efforts, and a manager of the digital-electronic-publishing and business-information networks.

Mathaisel is not suggesting that "the CIO ought to be nuked in favor of nothing," he stressed. Rather, the chief IT person, whatever the title, has an important role to play as "an agent of internal change," a mediator in the politics of information flow and the chief architect of the company's information infrastructure, he said. By that he means "not only the network and the topology of hardware platforms, but also the people, processes, procedures, standards, knowledge-based training and all that is required for the information delivery mechanism to be conceived, built and maintained."

The "I" in CIO, Mathaisel suggested, might well come to stand for infrastructure.

Mickey Williamson is a technical journalist in Warwick, Mass., who specializes in emerging technologies. She edits the newsletter "Case Strategies."

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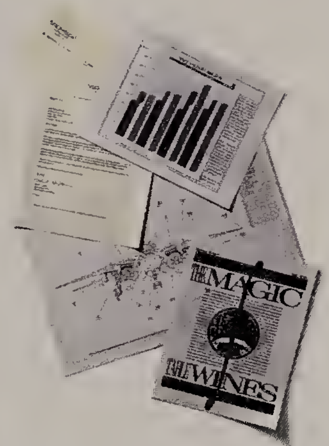

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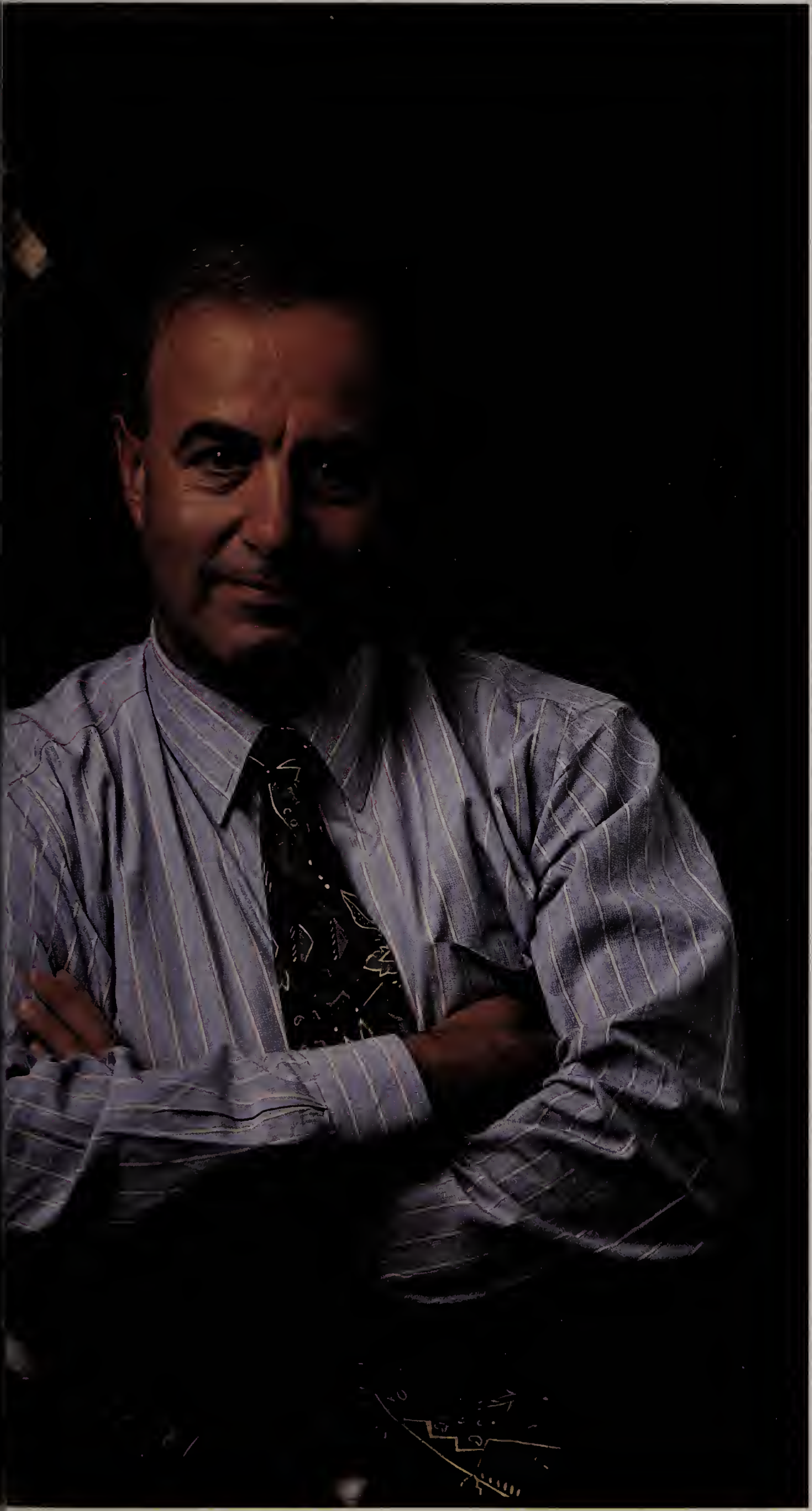
REENGINEERING *the* TURF

Now that the boundaries between IS and user organizations are inexorably being redrawn, CIOs face a new world order that calls for deftness, teamwork and flexibility

BY DAVID FREEDMAN

As the trend to push computer power out to users continues, the barriers that once segregated the IS function from the rest of the organization are falling as surely as did the Berlin Wall. Almost everyone agrees that's a good thing. But this redrawn map also presents fresh challenges to CIOs, such as having to figure out how to make sure users play a strong enough role in IS efforts—though without the CIO abdicating responsibility for keeping IS cost-effective and in line with corporate strategy. According to Philip Marzullo, director of information services for printers Lehigh Press in Cherry Hill, N.J., "the line between users and MIS is moving. Where it stops, nobody's sure."



Clearly, the line has been moving toward user control. One sample of the handwriting on the wall can be seen in a study of 16 companies—including General Electric, American Express, Bellcore and Mellon Bank—that tend to be on the leading edge of IS and that are developing new, customer-oriented systems. At 14 of the companies, the systems-development effort was initiated and is being managed by a non-IS department, typically marketing. "In general, these systems are no longer being driven by IS organizations," said Richard Bellaver, an assistant professor at Ball State University, who co-authored the study. "It is the operational unit that is defining the system and setting the budgets and time frames."

> "The line between users and MIS is moving. Where it stops, nobody's sure."
>
> *–Philip Marzullo*

Having control over such systems is no small matter; General Electric is expecting its new inventory-management systems alone to save it at least $100 million over the next three to five years, according to Bellaver. To that end, the company has set up a new center dedicated to application design and prototyping—a center that is run not by IS, but jointly under several operating groups.

All that is as it should be, contends Jonathan Harris, a partner and IS consultant with Price Waterhouse in New York. "MIS systems built by MIS people for the masses is a model that hasn't worked for a long time," he said. "The trick now is to have users understand technology's po-

PHILIP MARZULLO: *IS may still try to run the show by virtue of its expertise.*

PHOTO BY STEVE WEINREBE

tential and then decide how to get the most benefit from it." Letting user departments take control of projects is good for IS, too, added Harris; systems that would have been heavily criticized if supplied by IS departments can often seem all but perfect when users manage the process themselves.

But Harris also warns that organizations need to find a balance between giving IS departments complete control and cutting them out of the picture altogether. For one thing, he noted, the heavy cost-reduction pressures on organizations these days are causing senior management to look carefully at ways to consolidate and leverage IS efforts—tasks for which centralized IS management is well-suited. For another, user departments left to their own devices will sometimes develop systems that are good for that department but do little for anyone else. "A lot of the benefits from systems these days come from cross-functional elements," said Harris. "Without MIS acting as a catalyst to form multidisciplinary teams, you can end up with user fiefdoms that are blind to the requirements of the organization."

> "I tell line managers that if the project is falling behind, they better juggle some resources to get it done. I don't want them crying to me that it's all IS's fault."
>
> —*Jos Wintermans*

One organization that is trying to find that balance is Canadian Tire Acceptance Ltd., a credit and finance company headquartered in Welland, Ontario. CEO Jos Wintermans has already turned over the management of IS maintenance and smaller IS projects to user departments. But he has stopped well short of taking away all control from the IS department, which still leads the company's largest development projects. Instead, Wintermans has mandated a close working relationship between IS and the departments at which the new systems are aimed.

To foster that relationship, Wintermans has authorized yanking dozens of mid-level line managers out of their departments and placing them full-time on IS development teams for the duration of a project. In addition, some senior managers at the company spend as much as a fifth of their time on IS steering committees. "The biggest challenge in IS is to get line managers to be committed to the project," said Wintermans. "Line managers tend to focus on the short term, while IS needs to take a longer-term point of view."

To help make sure that commitment is there, Wintermans holds senior line managers, not IS managers, responsible for the successful, on-time delivery of systems—even though IS is running the project. "I tell [line managers] that if the project is falling behind, they better juggle some resources to get it done," he said. "I don't want them crying to me that it's all IS's fault."

E.I. du Pont de Nemours & Co.'s $7 billion chemical sector is taking a slightly different approach to developing a sense of shared IS responsibility among its IS and non-IS groups: It routinely rotates IS people through long stints in user departments, and vice versa. "We'll have line managers stay with us for two or three years before returning them to another business function," explained Steven T. Miller, manager of information systems for the sector. "And we'll send our people into the business for a while before pulling them back in."

It's not surprising that Miller is a big believer in well-rounded employees. Though he's been with du Pont since 1965, he's only been in IS for four years; most of his experience is in marketing, engineering, manufacturing and research. Now he commands a $100 million IS budget—and he said it's unlikely the company would appoint anyone to a senior IS position who didn't have

JOS WINTERMANS: *"The biggest challenge in IS is to get line managers to be committed to the project."*

PHOTO BY FOREST McMULLIN

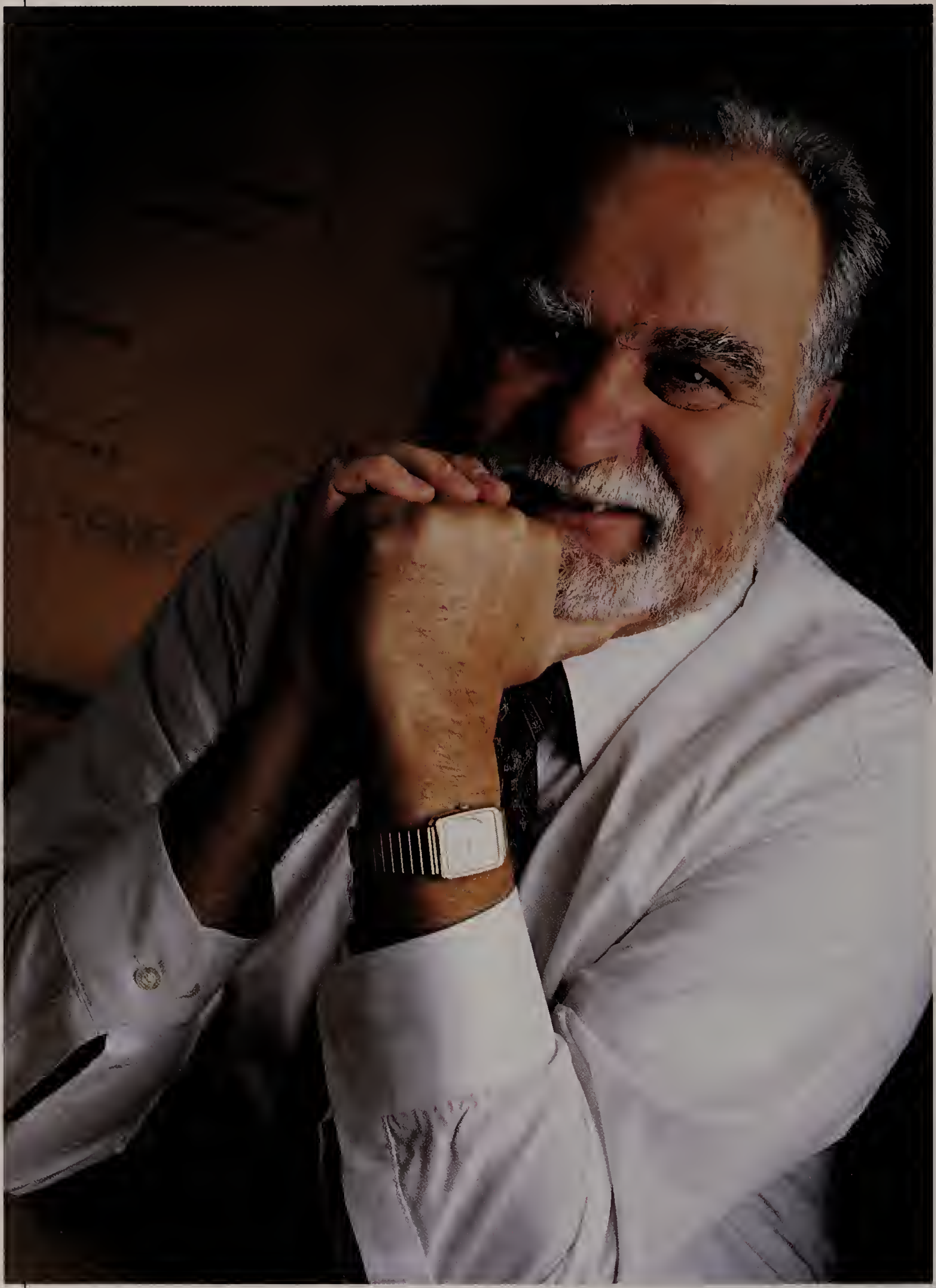
a strong business background. "People who make the switch in or out of IS have a much more holistic view of the business," he said. "Generally, it enhances their career, even though most don't switch permanently." The sector is also breeding the next generation of IS-savvy line managers: Most of the college hiring in the sector is done by Miller's group, which trains the hirees for a few years and then passes them on to other parts of the business.

One result of all this swapping is that teams made up of business and IS representatives tend to function more smoothly. "At first, people tend to approach the goals from their respective areas of expertise," said Miller. "But pretty soon the lines blur, and the next thing you know, you have IS people investigating business processes and users investigating systems."

Such blurring is also the rule at Lehigh Press, even though the company does no swapping of IS and non-IS staff. Lehigh's approach is to let users develop their own applications with as little involvement from IS as possible. And these aren't PC applications, either. At Lehigh, users employ fourth-generation database-query and report-writing tools from Oracle, DEC and other vendors to access local Digital minicomputer databases at each of the company's seven printing plants and a larger Digital computer running the corporate database in Cherry Hill. Some of the applications developed by users are impressive. For example, one plant put together an online job-status system that tracks printing jobs from the time the order comes in, through shop-floor data collection, and on to delivery.

IS Director Marzullo noted that bringing users to the point where they could produce these sorts of applications on their own wasn't easy. "It was a tremendous culture change, both for MIS and for the users," he explained. Starting a few years ago, IS had to shift its focus from building systems to teaching users how to produce reports and queries, and users had to spend a significant amount of time and money on training. "The users had always wanted more control of the information," said Marzullo. "But as they say, be careful what you wish for; you just might get it." Not all the users have gotten the hang of things, he noted, and it will probably take a few more years before the changes become ingrained.

Of course, there are limits to what users are able to accomplish on their own at Lehigh. IS is still responsible for maintaining the databases and executes the larger, more complex projects. Such projects are managed by joint IS/user teams, but Marzullo has found that these teams bear close watching, lest IS start trying to run the show by virtue of its technical expertise. "It often falls back into the IS person taking control of the meeting and telling the users what they want because [the sys-



DAN INFANTE: *Users get to call the shots, but portfolio managers bridge the gap between complete independence and corporate strategy.*

PHOTO BY WEBB CHAPPELL

tem] will work better," explained Marzullo. "We monitor the outcomes of the meetings to make sure that isn't happening."

At Digital Equipment Corp., in Maynard, Mass., Vice President of Information Management and Technology Dan Infante doesn't have a problem with IS telling users what to do. In fact, he has the opposite problem: Different departments are more than happy to go off and build systems on their own. "Everybody's an expert on the use of computers here," he said.

This independence once threatened to short-circuit Digital's efforts to share information and systems-development efforts across functions and geographical boundaries. Left entirely to their own devices, Digital subsidiaries in neighboring countries might each build similar financial systems from scratch, for example, or one division might end up with an order-processing system that didn't mesh well with that same division's manufacturing systems. "Once you start talking about globalization and business integration, you want a balance between a division's autonomy and leveraging your efforts," noted Infante.

To achieve that leverage, Infante has provided every major function in the organization with a "portfolio manager" who is—by job description and by experience—part "mini-CIO" and part business expert. The job of the portfolio manager assigned to, say, manufacturing, is to work with the manufacturing organizations in each of Digital's businesses to make each aware of what its counterparts throughout the company are doing with IS and to ensure that its IS efforts are well integrated into the rest of the business. "We've had strong portfolios of systems in our different functions," said Infante. "Now we want to break down the stovepipes and drive these processes horizontally across the business." Users still get to call the shots, he adds; the portfolio managers merely help bridge the gap between complete independence and corporate strategy.

> "We've had strong portfolios of systems in our different functions. Now we want to break down the stovepipes and drive these processes horizontally across the business."
>
> —*Dan Infante*

Sometimes IS needs to do something more radical in order to establish the right relationship with users. In the case of New England Electric System, a utility based in Southborough, Mass., IS had to redesign itself from top to bottom. The catalyst for this remake was Eric Cody, who took over the job of vice

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Doug Brueckner,
Vice President of New Systems Development,
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president and director of information services two years ago after serving the company for several years in planning and conservation. One of the first things he did was survey the company's different line departments to gauge their opinion of IS. It wasn't a pretty sight. Even IS personnel agreed they hadn't been doing well, listing 184 problem areas in a nine-hour brainstorming session. The top-ranked problem: IS didn't understand its customers' needs. "I came to the conclusion the department needed to be better integrated into the organization," said Cody.

Cody in effect disbanded and then reassembled the IS organization (though for the most part keeping the existing workforce intact). In the process, every single job in the organization was transformed. When the smoke cleared, users had a great deal more influence. Special IS departments were set up to service different business functions, and the line managers of the groups being served had a say in who ran these special groups (in half the cases, users—including a CPA and a power engineer—were brought in to head them up). All 15 major systems now being developed include the full-time involvement of user managers. "We're not going to fall into the trap anymore of delivering systems users don't want," said Cody. "If we don't get their commitment, they don't get the project."

Cody thinks his having come from outside of IS has helped with the endeavor. "It gave me credibility with senior management," he said. "I don't believe someone in IS could have gotten approval for a plan like that." In fact, Cody and his revamped department may have earned a little too much credibility: Requests for projects from the user community have skyrocketed from 400 last year to 1,500 this year.

Apparently it's not just users who have to be careful what they wish for. CIO

David Freedman is a freelance writer based in Brookline, Mass.

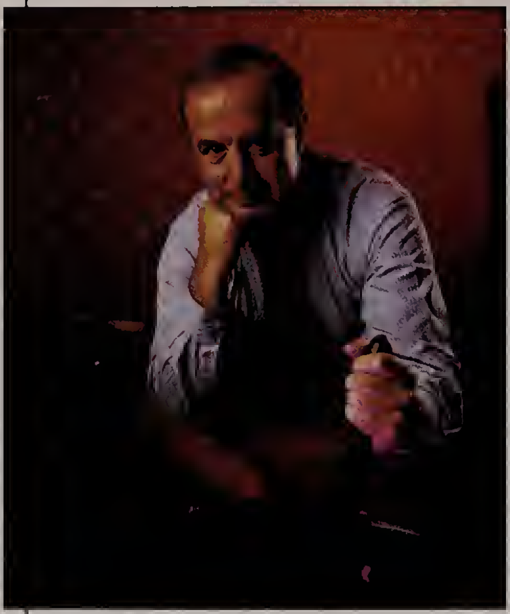
Harnessing User Power

Here are a few ways CIOs can ensure that users are playing a strong enough role in IS:

LET USERS FOOT THE BILL. On the theory that the way to users' hearts is through their pocketbooks, some companies have pushed IS budgeting responsibilities into the line departments that will benefit from the systems. The risk is that a paying line department may choose to cut IS out altogether.

A compromise is to use chargeback, whereby IS does much of the work and then bills the line departments. Jonathan Harris, a partner and IS consultant with Price Waterhouse in New York, suggests making chargeback meaningful to users by charging according to quantifiable business benefits—such as per invoice processed by the system, or per customer serviced.

New England Electric System, a utility based in Southborough, Mass., requires line managers to sign contracts specifying how a future system will pay for itself in increased revenues or lowered costs.



Philip Marzullo

BUILD TEAMS THAT BREAK DOWN BARRIERS. Joint IS/user teams can split into contentious factions or create long-term partnerships. There are ways of tilting the outcome toward the latter, contends Steven T. Miller, manager of information systems for the chemicals sector at E.I. du Pont de Nemours & Co.

"The psychology and culture of the team is crucial," he said. "It takes a supportive leader who understands team processes to create the right environment." In Miller's group, new teams spend anywhere from a few weeks to a few months hammering out non-IS-related agreements about how the team will function, and establishing shared values in the process.

TAKE ADVANTAGE OF THE REENGINEERING CRAZE. Jim Webber, president of Omicron, a consortium of major IS-using organizations, tried in vain to get CIOs to bring line managers to meetings—until Omicron sponsored meetings on business-process reengineering. "The role of users in reengineering is so key that it wouldn't make sense to talk about it without them," he said. "This is an opportunity for IS to play the right kind of role—educational and facilitative."

At Lehigh Press, IS doesn't get involved with reengineering until a line department has had a chance to reengineer its processes on its own. "That puts more of a burden on the user to define what they're looking for," said Philip Marzullo, director of information services. "Then they don't feel IS has imposed something on them."

—D. Freedman

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Mixed Messages

With all sorts of people using all manner of products to communicate over all kinds of networks, it's a wonder anyone ever gets the message

BY WALTER ULRICH

It is not unusual to find five, six or even more E-mail systems being used in one company, and in many cases, users cannot exchange messages among them. Companies that don't adequately interconnect diverse E-mail systems may find their productivity reduced and their ability to deal with urgent business imperatives impaired.

In a recent poll by management consultancy Arthur D. Little, in-house interconnection was identified as the most critical issue facing E-mail users. This is a doable but complex task. One must first select the communications gateways; be able to transfer messages and headers; provide consistent directory services; develop convenient, cost-effective access for roving users; and recognize the roles of interim and long-range strategies.

ILLUSTRATION BY ANDREA WISNEWSKI

Communications Gateways

Before a message can be transmitted from one point to another, a communications highway must connect the two points. Simple transport, however, is not enough. The message applications on either end must be able to "see" across the transport network to synchronize delivery at the application level.

At the pure transport level, there are bridges, routers and gateways galore to provide for physical interconnections. Most host-based systems have a star configuration, with all communications passing through the central host. LAN E-mail systems are designed to use X.25 networks to exchange messages between geographically remote points.

Many companies, however, have IBM Systems Network Architecture Distribution Services (SNADS) communications environments, which require communications between remote LANs to go through the central host. One remote LAN cannot "see" another remote LAN over SNADS, so there is a link missing at the application level. IBM's Advanced Program-To-Program Communications (APPC) and related products address these issues.

There are three alternative solutions to this problem. The first is to subscribe to or implement an X.25 network to exchange interlocation messages. While companies may not want to implement a new network simply as a message-exchange medium, many are finding other reasons to do so. In this case, a LAN interconnect is the best solution.

A second alternative is to consider software from third-party companies like Linkage, Phaser and SoftSwitch. These companies offer

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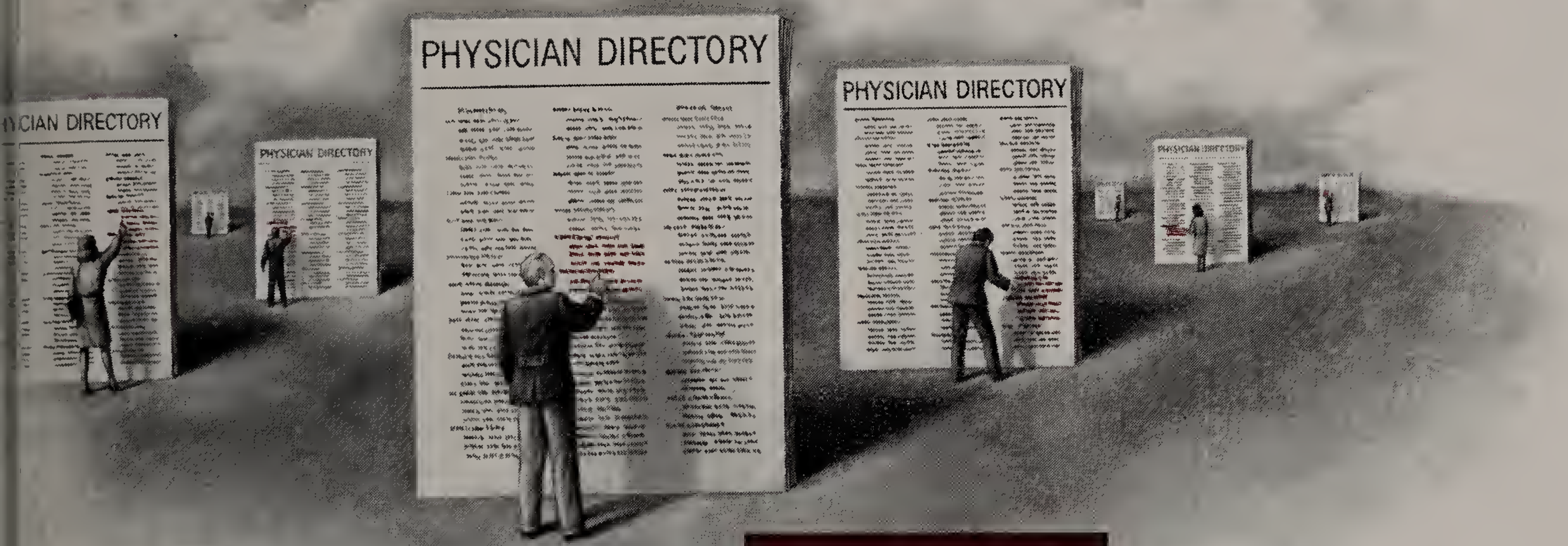

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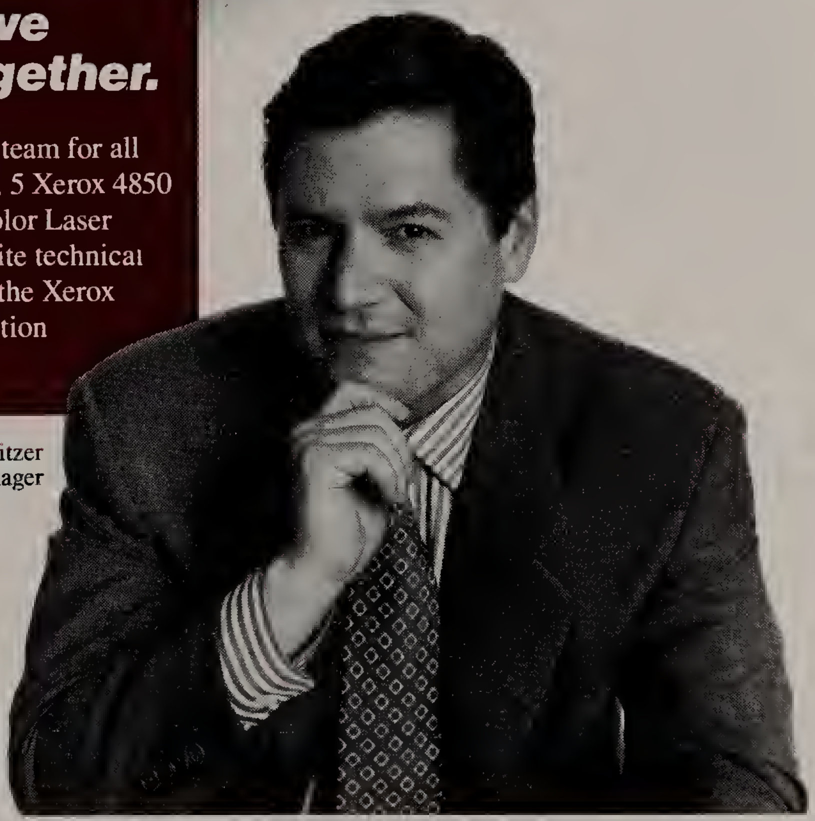

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practical alternatives for overcoming the obstacles to LAN connectivity over a wide area network.

A third option is to convert the LAN messages to a host-based message format, store them on the host-based E-mail system and then convert them back to the original format for delivery to the remote LAN. The inefficiencies in this approach are obvious, and the change in message appearance resulting from format conversion can restrict usage of powerful LAN E-mail features.

Transferring Messages and Headers

X.400 is an accepted standard that provides for exchanging E-mail header "envelope" information. An X.400 gateway is essential for any company intending to exchange E-mail with other companies. But for intracompany use only, X.400 may be too expensive or too complex.

If a company has only two E-mail systems in use, it is usually more effective to implement off-the-shelf pair-wise translation software designed to translate between two specific products. Pair-wise translators, often offered by the E-mail vendor, optimize efficiency and preserve all the common elements between two products. If more than two products are being used, multiple pair-wise translators and some good third-party translation software should be considered.

Pair-wise translation becomes unwieldy and unmanageable when more than a few E-mail products are involved. Interconnecting 10 different E-mail systems, for instance, requires 90 algorithms to do direct translations. However, some third-party vendors offer everything-to-everything products that translate to a common interim format, reducing the required number of translation algorithms to only 20. Moreover, to add an additional E-mail system with the common interim format would require only two additional algorithms; adding one without it would require 20.

Directory Services

In-house E-mail directories were rated among the top four issues in the ADL poll. Users reported fair progress on resolving the directory issues in the past year, and important advances were made in developing directory standards and products in 1991. However, this has yet to be translated into products that users are aware of.

X.400 offers a standard addressing format, but the address is hardly user-friendly. For example, my E-mail address is (C=USA, A=TELEMAIL, O=ADLITTLE, UN=ULRICH.W). How would you look the address up to find Walter Ulrich? What if your system permitted user names of only eight characters and the person you were trying to find was named Schwartzenegger or Schwartzkoff?

> *What if your system permitted user names of only eight characters and the person you were trying to find was named Schwartzenegger or Schwartzkoff?*

Although work on the X.500 standard for directory services offers a partial solution to these issues, X.500 is not always easy to implement. The North American Directory Forum (NADF), which represents leading E-mail providers, is developing and testing a common implementation approach. DEC, Hewlett-Packard, SoftSwitch, Microsoft and several other vendors have made good progress as well, and users can expect to see the results in 1993. In the meantime, some users are writing their own electronic directories. Others are evaluating third-party directory software emerging from specialized vendors. Many companies just use the telephone to find the E-mail address the first time they need it, and E-mail addresses are joining fax numbers on business cards.

Roving Users

In the era of star configurations, all users' mailboxes were kept in the same place, usually on a disk drive in a secure computer room. When users traveled, it was an easy matter to dial into that central location and access the message environment. Today, however, messages are stored on the user's LAN, and a large company may have hundreds of sites where messages are stored.

LAN E-mail systems provide remote users with immediate access to the local mailbox, but some companies object to the expense of providing remote-access facilities on every LAN. Others are not comfortable with the potential security problems in such an arrangement. Some alternatives exist, but they are far from ideal. For example, messages destined for traveling recipients can be redirected to a centrally located LAN set up for this purpose, a host-based E-mail system or a third-party E-mail service. A well-designed LAN internet can solve this problem by providing the necessary application connectivity.

LAN E-mail across multiple communications boundaries in a multivendor environment is inevitable. Investments in traditional approaches and isolated, ad hoc E-mail initiatives will just add to the complexity and waste time and money. The solution is to adopt an electronic messaging strategy with both short- and long-term goals. The full power of today's E-mail solutions can be harnessed by carefully matching business goals, users' needs and available technology. A flexible communications architecture combined with a full migration strategy will assure a minimum of disruption and optimize the usage and benefits of electronic mail. CIO

Walter Ulrich is director of Arthur D. Little's Pacific Southwest region in Los Angeles. He is also the founder and a board member of the Electronic Messaging Association.

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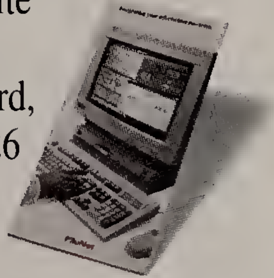

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1. Sales through dealers and carriers, street vendors and counter sales	0	0
2. Mail subscriptions paid and/or requested)	65,768	68,175
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D. Free distribution by mail, carrier or other means, samples, complimentary and other free copies	6,768	6,754
E. Total distribution (Sum of C and D)	72,536	74,929
F. Copies not distributed		
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I certify that the statements made by me above are correct and complete.

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Carol A. Spach, Circulation Director

OFF THE SHELF

THE CUSTOMER COMES SECOND, AND OTHER SECRETS OF EXCEPTIONAL SERVICE

By Hal F. Rosenbluth and
Diane McFerrin Peters
William Morrow (New York), 1992
240 pages, $20

THE CUSTOMER COMES SECOND
AND OTHER SECRETS OF EXCEPTIONAL SERVICE
HAL F. ROSENBLUTH
AND DIANE McFERRIN PETERS

Just when we all thought we had the service thing down pat—the customer comes first, right?—along comes Hal Rosenbluth, CEO of phenomenally successful Rosenbluth Travel in Philadelphia (see "The Mad Doctor of Corporate Travel," *CIO*, May 1, 1992), to tell us that, no, the *employee* comes first. In *The Customer Comes Second*, written with Diane McFerrin Peters, Rosenbluth asserts that the average workplace creates competition between employees, overwork, stress, fear and other ills. Miserable employees are not going to put the customer first, no matter what the corporate credo.

Rosenbluth's book describes his company's efforts to build a work environment that fosters teamwork, open communication, security, excellence and innovation. Yes, we've heard this one before, and we haven't quite believed it. Unfortunately, for many corporations, employee satisfaction is an ideal readily sacrificed to more compelling objectives, such as profitability and efficiency. But the author demonstrates that profits are a natural extension of happiness in the workplace.

Rosenbluth's approach begins with teamwork and open communication. He regularly surveys associates, polls mid-level managers and forms random focus groups to get readings on morale. Any associate can express ideas or concerns to any manager or to Rosenbluth himself via voice mail. And associates regularly evaluate their leaders' performances—Rosenbluth's included.

The company invests heavily in philosophical, technical and leadership training, as well as in a formal quality program. Team-building exercises and interdepartmental exchange programs give employees a sense of the company as a whole and their place in it.

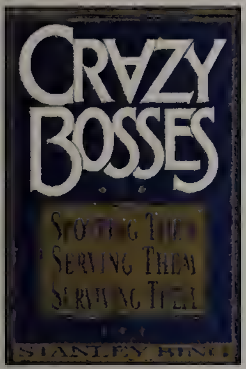
The fruits of Rosenbluth's efforts include 7,500 percent growth in the last 15 years, a 6 percent turnover rate in an industry where turnover runs as high as 50 percent, a client-retention rate of 90 percent and $1.5 billion in annual sales.

The company's approach to service is cultural, functional and, one may infer from its excellent reputation, inspirational. Rosenbluth advocates inducting employees into the corporate culture as a means of encouraging those who want to build a career with the company and weeding out those who merely want to build a career. He urges business leaders to abandon corporate systems that reward employees for being politically savvy and instead to focus on rewarding good work, team play and integrity.

The author may take some flack from business pundits for suggesting that companies hire only nice people because they bring caring and unselfishness to the workplace and because "nice people do better work." But if rapid growth, high profits and low turnover are any indicators, Rosenbluth is on to something.

CRAZY BOSSES

By Stanley Bing
William Morrow (New York), 1992
272 pages, $20



Stanley Bing is not a happy man. That's because he is a middle manager—that species of white-collar wildlife which, these days at least, most resembles a tin duck in a shooting gallery. Bing (not his real name), who writes a spiritedly depressed monthly column for *Esquire* magazine, bases *Crazy Bosses* on the premise that in American management circles, crazy bosses are the predictable Darwinian adaptation to the larger corporate madness that gained respectability during the zany 1980s.

The problem wasn't bad management per se, writes Bing; it was "admiration of bad management." (He notes that the business press generally played this game, massaging the images of the leading Huns unless they were "actually under indictment," and he quotes a *Fortune* profile of Frank Lorenzo characterizing the soon-to-be wrecker of Eastern Airlines as "flinty" and "hard-driving." They can say that again.)

Faced with a culture that celebrated and egged on the greedy, indifferent raiders who gutted decent businesses for fun and (egregious) personal profit, what models remained for bosses to ape? Just the nutso ones, says Bing. Forget decency, ethics, humanity and reason. Merely surviving in such a climate required new norms, none of them pleasant to labor among.

These newly honored norms, of which Bing presents many colorful and harrowing examples, are embodied in five general types of crazy bosses: the paranoid, the bully, the narcissist, the bureaucrazy (a.k.a. the organizational fascist), and the disaster hunter (who is always looking for a place to crash and burn, preferably right on top of *you*).

"In a healthy company," writes Bing, "with halfway decent values and communication between people and departments, a crazy boss will be cut off from the herd, wither away and, eventually, find himself a job in an organization crazy enough to appreciate his strengths."

Refreshingly, *Crazy Bosses* is not a how-to book that will instruct readers in coping with insanity in their bosses or—assuming that many readers are also bosses—in themselves. But on the theory that knowledge is power, Bing's quite entertaining jeremiad provides a context for understanding the pain that many of us at work today in America are suffering.

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